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Robust Image Retrieval using Dominant Colour with Binarized Pattern Feature Extraction and Fast Correlation

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Abstract- The modern technology providing the sharing of information at very fast rate such as audio, video and images. The sharing of such data also increased as the social networking sites become popular among young generation. Now the online databases of images is so huge having millions of images, and the searching of images we need is crucial task. For such applications various image retrieval methodologies is proposed. In this paper we are proposing very efficient image retrieval technique based on dominant colour features extraction and pattern feature extraction. In the simulation results we have found that from around 6000 images proposed algorithm takes only 1.5 seconds to retrieve results. That is why this approach is significant in terms of retrieval speed.

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Abstract- The modern technology providing the sharing of information at very fast rate such as audio, video and images. The sharing of such data also increased as the social networking sites become popular among young generation. Now the online databases of images is so huge having millions of images, and the searching of images we need is crucial task. For such applications various image retrieval methodologies is proposed. In this paper we are proposing very efficient image retrieval technique based on dominant colour features extraction and pattern feature extraction. In the simulation results we have found that from around 6000 images proposed algorithm takes only 1.5 seconds to retrieve results. That is why this approach is significant in terms of retrieval speed.

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I. Introduction

Content Based Image Retrieval is a term used to describe the process of retrieving images form a large collection on the basis of features(such as COLOUR, texture etc) that can be automatically extracted form the images themselves [19]. The retrieval thus depends on the contents of images. CBIR is comparatively a new topic and has turn into a hot research subject in last few years. The features that are used in CBIR should correspond directly to general routine notions of the human vision. For example, COLOUR, texture and shape are general terms used by most of people.

These features are mostly used for CBIR. But it is hard to define precisely how these features are discriminated by humans. Also, such discriminations are different for different people. Thus we need to pre-define the suitable feature representation scheme for each of these features. These features can be applicable over complete image or over a small region of the image. It is found that in most image retrieval systems, COLOUR based features play a prominent role. Indeed, COLOUR is the most important factor in human perception. The majority common representation of COLOUR information is in the form of COLOUR histogram, which statically is the probability of any given pixel having a Specific intensity in each of the COLOUR channels. COLOUR anglogram [20], correlogram [18], COLOUR co occurrence matrix (CCM) [22] are some of the other feature representations for COLOUR.

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II. System Model

In content-based image retrieval (CBIR) image databases are indexed with descriptors derived from the visual content of the images. Most CBIR systems are worried with estimated queries where the aim is to find pictures visually similar to a particular target picture. In most cases the goal of CBIR systems is to replicate human perception of image similarity as well as possible. CBIR presents a challenging problem since it has common elements with both the general image understanding problem (which seems to remain unsolvable for computers at least in the near future) and the field of general information retrieval. Humans excel in image understanding when compared with computers. In contrast, in systematic handling of large databases computers have an edge over us. For this reason CBIR is also potentially very rewarding.

Global histogram gives information about the COLOUR contents of image and not the spatial distribution of COLOUR in image. Thus COLOUR feature alone cannot give satisfactory results. Texture can give additional information about the spatial arrangements and patterns of varying intensity available image. Texture is an important element to human vision. Texture has been found to provide cause to scene depth and surface orientation. People also tend to relate texture elements of varying size to a 3-D surface. Even in graphic systems greater realism is achieved when textures are mapped to 3-D surfaces. Gabor filters, Tamura filters, Gray level co occurrence matrix (GLCM) etc are used for the texture representation. Discrete Wavelet Transform (DWT) is found to be an effective tool for signal analysis. Wavelets have properties that are suitable for representation of an image texture. Daubechies wavelets and Haar wavelets are some of the examples of texture representation [19]. Shape information is considered to be one of the most difficult features to extract reliably from images since there are no mathematical definitions of shape similarity which

can take into account the various qualities which human assign to shape. While using shape, it is important that the representation should be invariant to basic transformations such as rotation, scale etc. some of the features that are used to represent shape are moment invariants, circularity, area, minimum and maximum axis.

These features of the database images are calculated offline and stored into database. User gives one image as the query image (which may be uploaded or selected from the previous results). Then a system calculates corresponding features for the query image. Similarity measure takes these feature values and those from database and calculate the similarity among query image and each of the database images.

Database images finally are ranked and displayed according to similarity measure.

In general, CBIR can be described in terms of following stages:

a) Identification and utilization of intuitive visual features.
b) Features representation
c) Automatic extraction of features.
d) Efficient indexing over these features.
e) Online extraction of these features from query image.
f) Distance measure calculation to rank images.

III. Proposed Methodology

The image retrieval system proposed in this paper is described below with the block diagram and flow charts. In Fig. 3.1 block diagram of feature database preparation is described. in Fig. 3.2 block diagram of image retrieval is proposed. In Fig. 3.3 flow chart of feature database preparation algorithm is explained. In Fig. 3.4 flow chart of image retrieval algorithm is explained.

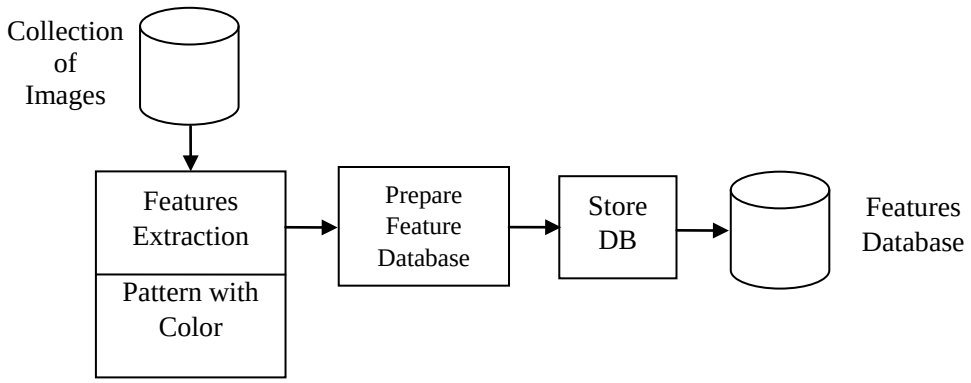

Figure 3.1 : Block Diagram of Feature Database is preparation

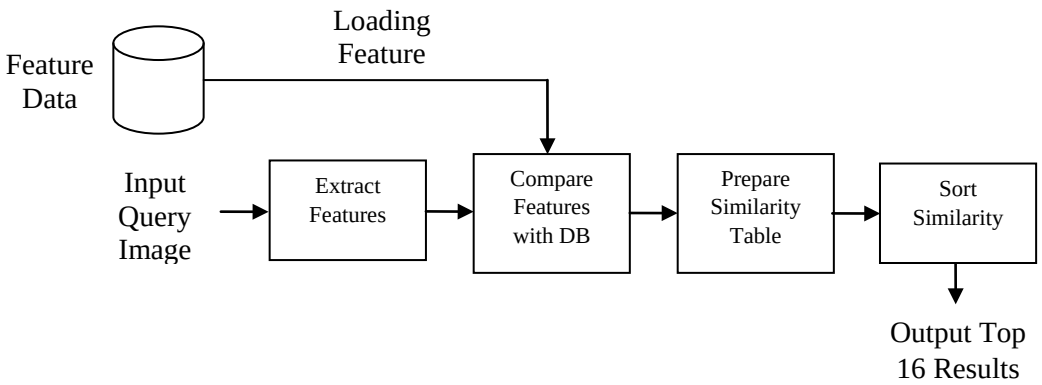

Figure 3.2 : Block Diagram of Image Retrieval

In the block diagrams the proposed methodology is described in first figure the Feature Database is prepared by using the collection of images, features extraction and pattern with color so the preparation of database has been done and then after store in Database.

In this figure the Image Retrieval process is described by using the Feature, Extract the Features from image and compare with Feature Data Base then prepare the similarity table at the end 16 Similar results have been carried out.

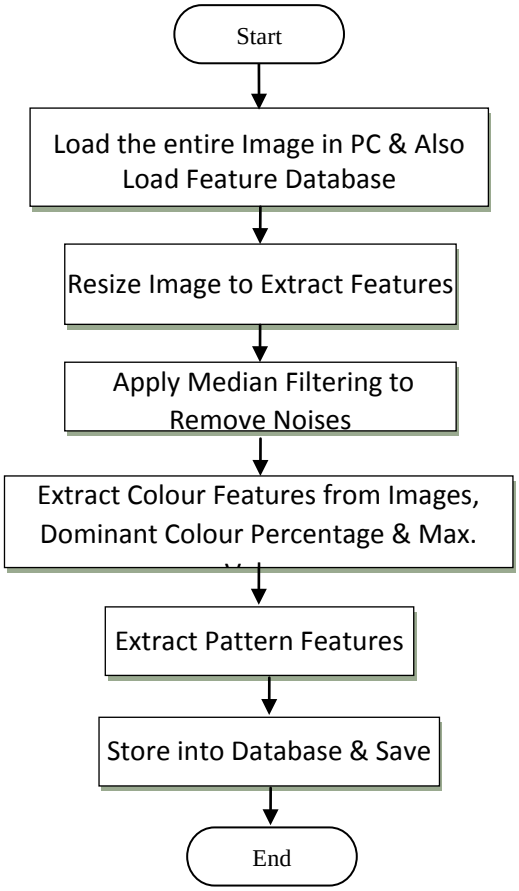

Figure 3.3 : Flow char of feature database preparation

a) Preparing Features Database

In the first flow graph preparing the features database process is achieved in which all images is loaded in PC and also feature database is loaded then resizing to extract feature is done then after Median Filter is adopted for removing the noise then extraction of colour feature from images is done then find out the dominant colour percentage and maximum value is achieved then extraction of pattern feature and store into database.

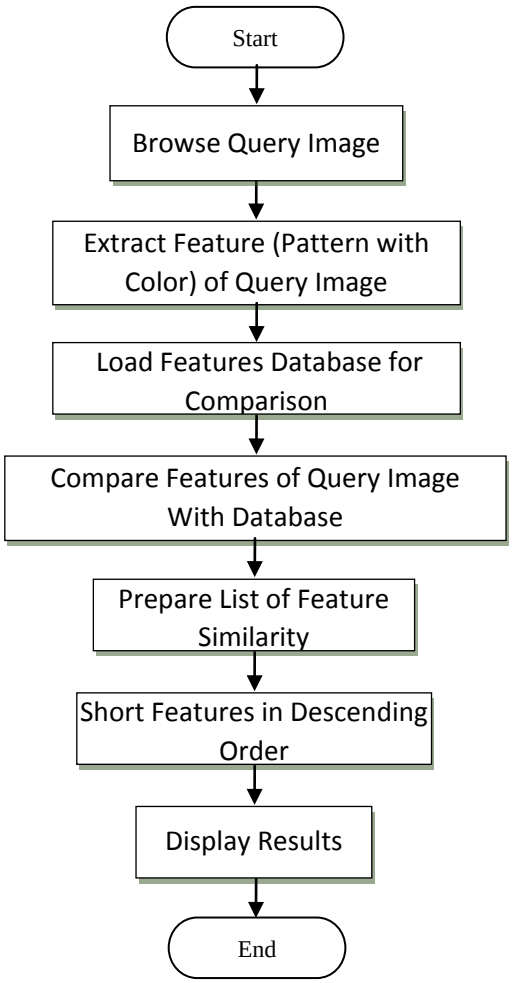

Figure 3.4 : Flow char of image retrieval

b) Image Retrievals

In this flow graph the image retrieval process is achieved. First of all browsing the Query Image then extract feature (Pattern with Color) of Query Image then Loading of Features Database for Comparison purpose then Comparing Features of Query Image after that list is prepared for Feature Similarity then short features in descending order and finally the results have been displayed.

IV. Simulation Results

Image retrieval proposed methodology is implemented on simulation tool and various results are found. The main reason is to develop advanced technique is to get the images from the huge collection faster than every other technique with meaningful results. In this section simulation results of proposed method is shown with different color and shapes.

Figure 4.1 : Retrieval Results of Red Colour and time taken is 1.8268 seconds

Figure 4.2 : Retrieval Results of Green Colour and time taken is 1.8207 seconds

In Fig. 4.1 proposed algorithm trying to retrieve images of red colour looking similar to girl and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images in descending order that is most similar images appear first in the results. The time taken to get the results is 1.8268 seconds.

In Fig. 4.2 proposed algorithm trying to retrieve images of green colour looking similar to cup and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images from images collection and arrange in descending order i.e. most similar images appear first in the results. The time taken to get the results is 1.8207 seconds.

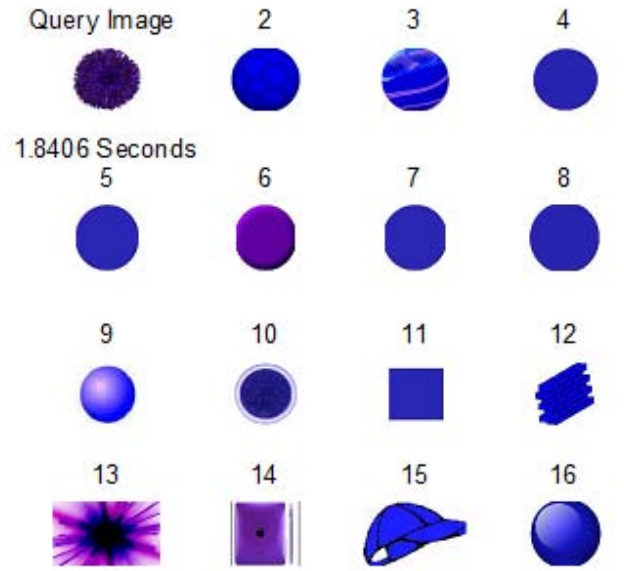

Figure 4.3 : Retrieval Results of Green Colour and time taken is 1.8406 seconds

In Fig. 4.3 proposed algorithm trying to retrieve images of blue/purple colour looking similar to circle or sphere and the similar results are displayed in the figure. In the retrieved results algorithm first trying to find out the similar images from images collection and arrange in descending order i.e. most similar images appear first in the results. The time taken to get the results is 1.8406 seconds.

As we were tried for other shapes and colours the results algorithm takes on an average 1.8 seconds to retrieve each images for each query.

V. Conclusion and Future Scope

Image retrieval is growing and in demand technique used in wide area of application like search engines, social networking sites, surveillance systems etc. The need of image searching is either colour based or patterns. In the proposed methodology of this paper we have adopted method for colour based retrieval as well as pattern based retrieval and we have tried to make is faster like 1.8 seconds to get results.

In the upcoming time hybrid form of multiple techniques definitely improve the accuracy as well as retrieval time.

References Références Referencias

1. H. Tamura, and N. Yokoya, "Image Database Systems: A Survey," Pattern Recognition, vol. 17, no 1, pp.29–49, Sep. 1984.
2. S. Gerard, C. Buckely, "Term-Weighting Approaches in Automatic Text Retrieval," Information Processing and Management, vol. 24, no.5, pp. 513-523, Jan. 1988.

3. Y. Chen, J. Wang, "Image Categorization by Learning and Reasoning with Regions," Journal of Machine Learning Research, vol. 5, pp. 913–939, May 2004.
4. F. Long, H. Zhang, H. Dagan, and D. Feng, "Fundamentals of content based image retrieval," in D. Feng, W. Siu, H. Zhang (Eds.): "Multimedia Information Retrieval and Management. Technological Fundamentals and Applications," Multimedia Signal Processing Book, Chapter 1, Springer-Verlag, Berlin Heidelberg New York, 2003, pp.1-26.
5. Gudivada and V. Raghavan, "Content-based image retrieval systems," IEEE Computer, vol. 28, no 9, pp18-22, Sep. 1995.
6. M. Kherfi, D. Ziou, and A. Bernardi, " Image Retrieval From the World Wide Web: Issues, Techniques, and Systems," ACM Computing Surveys, vol. 36, no. 1, pp. 35–67, March 2004.
7. M. Flickner, H. Sawhney, W. Niblack, J. Ashley, Q. Huang, B. Dom, M. Gorkani, J. Hafner, D. Lee, D. Petkovic, and P. Yanker, "Query by image and video content: The QBIC system," IEEE Computer, vol. 28, no 9, pp.23-32, Sep. 1995.
8. A. Pentland, R. Picard, and S. Sclaroff , "Photobook: Content based manipulation of image databases," International Journal of Computer Vision, vol.18, no 3, pp.233–254, June 1997.
9. J. Smith and S. Chang, "Visualseek: A Fully Automated Content-Based Image Query System," Proceedings of the 4th ACM international conference on Multimedia table of contents, Boston, Massachusetts, United States, Nov. 1996, pp. 87-98.
10. A. Gupta, and R. Jain, "Visual information retrieval," Comm. Assoc. Comp. Mach., vol. 40, no. 5, pp. 70–79, May. 1997.
11. J. Li, J. Wang, and G. Wiederhold, "Integrated Region Matching for Image Retrieval," In Proceedings of the 2000 ACM Multimedia Conference, Los Angeles, October 2000, pp. 147-156.
12. Rao, M.B.; Kavitha, C.; Rao, B.P.; Govardhan, A., "A new feature set for content based image retrieval," Information Communication and Embedded Systems (ICICES), 2013 International Conference on , vol., no., pp.84,89, 21-22 Feb. 2013.
13. Lunshao Chai; Zhen Qin; Honggang Zhang; Jun Guo; Shelton, C.R., "Re-ranking using compression-based distance measure for Content-based Commercial Product Image Retrieval," Image Processing (ICIP), 2012 19th IEEE International Conference on , vol., no., pp.1941,1944, Sept. 30 2012-Oct. 3 2012.
14. Haipeng Li; Jianbo Lu; Jiang Yu, "An image retrieval method based on fractal image coding," Systems and Informatics (ICSAI), 2012 International Conference on , vol., no., pp.1866,1869, 19-20 May 2012.
15. Edmundson, D.; Schaefer, G., "Flickr Retriever -- Fast Retrieval of Flickr Photos," Web Intelligence and Intelligent Agent Technology (WI-IAT), 2012 IEEE/WIC/ACM International Conferences on , vol.1, no., pp.639,640, 4-7 Dec. 2012.
16. Abdelrahim, A.S.; Abdelrahman, M.A.; Mahmoud, A.; Farag, A.A., "Image retrieval based on content and image compression," Multimedia Technology (ICMT), 2011 International Conference on , vol., no., pp.6696,6703, 26-28 July 2011.
17. An-Zen Shih, "The application of fractal compression to content-based image retrieval: Comparison of techniques", Multimedia Technology (ICMT), 2010International Conference on , vol., no., pp.3356,6484, 26 Apr 2010.
18. Huang J., Kumar S.R., Mitra M., Zhu W.J., Zabih R., "Image Indexing using Color Correlograms", IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1997 pages 762-768.
19. Siddique S., "A Wavelet Based Technique for Analysis and Classification of Texture Images", M.S Thesis, Carleton University, Ottawa, Canada, April 2002. www.sce.carleton.ca/faculty/cuhadar/CBIR/files/ finalreport.doc.
20. Zhao R., Grosky W.I., "Narrowing the Semantic Gap-Improved Text Based Web Document Retrieval Using Visual Feature", IEEE Transactions on Multimedia Vol.4, No.2, June 2002 pages 189-200.

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