Review On Content Based Image Retrieval

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ABSTRACT: Nowadays, we are surrounded by multimedia devices. Many of us have cameras, a cellular phones, an audio/video players, and so on…

The explosion of digital data in all these forms (audio, video, image, text,) have arisen a question of relevant retrieval from the database/repository which could be very large. Traditional information retrieval techniques does not meet the user's need, so there is need to develop an efficient system for content based image retrieval. Content based retrieval is used for fast and exact way of retrieval. In this paper the techniques of content based retrieval are discussed and compared. It is done using low level features such as color, texture, shape, edge density, and clustering algorithm such as K-mean and C-mean algorithm for retrieval of image.

KEYWORDS: Feature Vector, Texture, Content based image retrieval, K-Means Clustering Algorithm and C-Means Clustering Algorithm.

1. INTRODUCTION

Advances in data storage and image acquisition technologies have enabled the creation of large visual datasets. It is necessary to develop an appropriate information system to efficiently manage these collections. The common approach is the use of Content-Based Image Retrieval (CBIR) system. The system here, try to retrieve images similar to a user-defined specification or pattern (e.g., shape sketch, image). Its major goal is to support image retrieval based on content properties such as shape, color, texture, etc... are usually encoded into feature vectors. The major advantages of CBIR approach are the possibility of an automatic retrieval, instead of the traditional approach (keyword-based) approach, which is usually very laborious and time-consuming as compare to previous annotation of database images. The CBIR approach had been used for several applications such as fingerprint identification system, biodiversity information, digital libraries, crime prevention, medicine detail system, historical research, among others. Here, the paper aims to introduce the problems and challenges during the creation of CBIR systems, it also explain the existing solutions and applications, and to present the existing research in this area.

Content Based Image Retrieval (CBIR) is a technique which uses visual contents, normally called as features, this can be, shape, color, texture, edge. Etc…to search images from large scale image databases according to users' requests in the form of a query image. The Content based retrieval of visual data requires a paradigm that differs significantly from both traditional databases and text based image understanding systems. The challenge in CBIR is to develop the methods that will increase the retrieval accuracy and reduce the retrieval time.

Among them, Color feature is often broadly used to describe the images which are difficult to be segmented and need not to be considered as space information. Texture is an important feature, due to its presence in most real and synthetic world, which makes it a high attention not only for CBIR but also for many other applications in computer vision, medical imaging, and so on.

2. RELATED WORK

Jing Huang et.al[1,2] discussed new feature called color correlogram for image indexing and comparison .this new feature computed efficiently and show that performance very well. Sim, D. G., H. K. Kim and R. H. Park [3, 4, 5] the image retrieval scheme for JPEG formatted image is

presented. Content based image retrieval for JPEG images has attracted many people's attention and a series of algorithms directly based on the discrete cosine transform domain, also to have full advantage of DCT coefficients and to consider the color and texture information for the retrieved images. Here, images are decompressed and then they are performing in the spatial domain. The feature vectors from several DCT coefficients are computed and this operation is performed in the partial decoded domain, which can greatly decrease the retrieval complexity**.**

M. Flickner et.al [6, 7, 8] proposed Color histograms are efficient in computation, and are generally insensitive to small change in camera position. The color histogram provides only a very coarse characterization of an image. An image with similar histograms can have dramatically different appearances. Here, to describe a method which imposes additional constraints on histogram based matching. In histogram refinement, the pixels within a given bucket are split into classes based upon some local property. Split histograms are compared on a bucket based on bucket basis, similar to standard histogram matching. In a single given bucket, only pixels with the same property are compared. Two images with similar color histograms can have different split histograms. Split histograms gives a finer distinction than color histograms. This is comparatively important for large image databases, where more than one image can have similar color histograms. Here, a split histogram can also be called as color coherence vector (CCV), which partitions each histogram bucket based on spatial coherence. A database with 15,000 images can be queried using CCV's within 2 seconds or even less. This can be demonstrated using histogram refinement and can be used to distinguish images

A. P. Berman et.al [9, 10] found that technique fairly integrates a diverse and expandable set of image properties (color, texture, and location) in a retrieval framework, it also allow the end users substantial control over their use. A novel set of evaluation methods is proposed in addition to applying established tests for image retrieval; our technique proves competitive with state of art methods in these tests and does better on certain tasks. The Stairs algorithm can operate in a regional query mode with only a moderate increase in computational overhead. For certain queries this capability significantly increases the relevance of the images retrieved. Furthermore, it improves on many standard image retrieval algorithms by supporting queries based on subsections of images. The merits of drawing on different types of image features for Image retrieval are firmly established. Their work capitalizes on this trend, and providing a framework to fairly and consistently diverse integrating image properties into a description amenable for a fast, reliable image retrieval system.

J. Zhang et.al [11, 12, and 13] suggests the image retrieval based on the textural information of an image, as orientation, direction, and the regularity of an image. It utilizes the texture orientation for the construction of the rotated Gabor transform, also for the extraction of the rotation-invariant texture feature. Here the directionality and regularity are the main features which are used in the proposed approach for similarity assessment. Using these features, we finally propose an efficient mechanism for CBIR and examine it through some applications. The system now compares the features of the query with features of images in the collection based on some matching criterions, as three features are used in this work there are three matching score that are to be computed. A weighted average of the matching scores is then calculated to get a final score for each image. Finally, rank images based on these final scores and top-ranked images are displayed to the user as the result of retrieval.

Haralick RM et.al [14, 15] discussed the four image features are extracted by this system, which are color feature (HSV color histogram), texture feature (co-occurrence matrix), shape feature (moment invariant based-on threshold optimization), spatial relationship feature (based-on the Markov chains). According to the statistical analysis of the experiment results discover that the four visual features describe image characters variously. The retrieval precision based on color feature is better than based on texture feature. An image retrieval method combined color and texture features. According to the texture feature of the image, image feature statistic is defined. With the use of feature weight assignment operators designed here, weights can be assigned to color and texture features according to image content adaptively and realize image retrieval based on combined image features. The retrieval results are more exact and efficient than other methods based on single feature and simple linear combined features of fixed weight here the results are more suitable to the human visual characteristic. The rate of error matching is decreased and weight assignment is logical.

P.S.Hiremath et.al [16, 17, 18, 19] discussed four approaches such as multispectral Approach, HSV, YCbCr, and gray scale texture features for color texture analysis. The wavelet decomposed coefficient of image and its complements by using texture feature. Their experiments are carried out on Wang's dataset using JSEG for segmentation and compare the four different color spaces. Finally haar wavelet is more effective in texture feature compare with other wavelet approaches, these results are comparatively encouraging.

P. S. Hiremath and Jagadeesh Pujari [20] discussed an integrated matching scheme based on higher priority of similar image and the adjacency matrix of a bipartite graph by using tiles of query. Shape information is computed by Gradient Vector Flow fields. This demonstration is comparatively efficiency as compare to wavelet method. K.P. Ajitha Gladis and K.Ramar [21, 22] discussed mainly as the image can be represented on the statistical properties, image morphological features and fuzzy cluster features in order to get more accurate results. The distance is measured through a back propagation network.

Son Lam Phung and A. Bouzerdoum proposed new feature called edge density. It differentiates objects from non-objects using image edge characteristics. In this, the approach is based on a fast object detection method. The edge density, which measures the specific region of the object, which can be computed more efficiently.

Hierarchical Algorithm is used to group similar images into clusters and RBFN Network which uses K-Means clustering and Gaussian function to retrieve the similar images. So as to get the better favored image results and Gnaneswara Rao et.al discussed the texture of an image is computed by using wavelet transformation because it's quite efficiently and also using clustering algorithm, to construct indexed image database based on the texture feature. Here, clustering is used to give a good matching and to reduce the undesirable noise. P.AnandhaKumar and V.Balamurugan proposed two indexing technique such as Spatial assess method (SAM) and metric access method (MAM).

SAM providing good result on low dimensional feature. MAM-based technique with balanced and dynamic indexing is called feature based adaptive tolerance tree. Feature Based Adaptive Tolerance Tree (FATT), which brings effective solution and to increase efficiency of image retrieval.

Rajshree S. Dubey et.al discussed four techniques as Color Histogram, Color moment, Texture, edge histogram and it involves pattern recognition. Because it's most important tool for machine vision.

Kondekar V. H. et al discussed Image color quadratic distance for histogram, Euclidian distance for image wavelet transform Hamming Distance for retrieval of an image. From these distance formulae is to increase the retrieval efficiency of an image. Ritu Shrivastava discussed to compare two clustering techniques such as K-mean and C-mean clustering for distance metric concept. Finally, K- mean algorithm is easy and fast to compute. C- Mean algorithm requires a long computational time. Both converges but suffers from the problem of local minimum.

3. CONCLUSION AND FUTURE WORK

In this survey paper candy method is easy and fast to compute the process. Image splitting and image compaction is to reduce the computation complexity by reducing feature vector size and Haar wavelets are used, since they are more effective compared to other wavelets. the paper they provide several methods, in that each method fulfills their works. The results are quite good for most of the query images and it is possible to further improve, to use genetic algorithm, cluster algorithm such as hierarchical clustering, Cure data Clustering, fusion algorithm and any other technique will including in CBIR, it will give the better and effective retrieval of an image.

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