ISSN 2320 - 2602
Volume 9 No.7, July 2020
International Journal of Advances in Computer Science and Technology
Available Online at http://www.warse.org/IJACST/static/pdf/file/ijacst12972020.pdf
https://doi.org/10.30534/ijacst/2020/12972020

CBIR (CONTENT BASED IMAGE RETRIEVAL)

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ABSTRACT

This paper presents a technique for Content Based Image Retrieval (CBIR) by utilizing the advantages of low-complexity ordered-dither block truncation coding (ODBTC) at its best for the image content descriptors. ODBTC, in its encodingstage,compressesanimageblockintocorresponding quantizers and bitmap image. In this context, two image features, namely, colour co-occurrence feature (CCF) and bit patternfeatures(BPF)areusedtoindextheimages.Boththese features are directly generated from the ODBTC encoded data streams without performing the decoding process. The BPF and CCF of an image are derived from the two ODBTC quantizers and the bitmap. Experiments shows that the proposed method is superior to the block truncation coding system of image retrieval and other earlier methods, and thus proves that the ODBTC scheme is not only preferred for image compression, but also offers a simple and effective to index the images in CBIRsystem.

Key words : BPF: bit pattern features; CBIR: content based image retrieval; CCF: colour co- occurrence feature; feature extraction; ODBTC: ordered dither block truncation coding.

1. INTRODUCTION

1.1 Python

Python is an interpreted, high level, general purpose programming language. Python's design philosophy emphasizes codereadabilitywithitsnotable useofsignificant white spaces. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small as well as large scale projects. Here, using this language, IR system is created which returns a set of images from a collection of images. Django in python is used to provide web framework and also due toversatility.

1.2 CBIR

CBIR means Content Based Image Retrieval, mainly this IR system returns a set of images from a collection of images in the database. Here the images are selected based on the image content similarity, edge pattern similarity, colour similarity, etc. It is used in the real time applications. This methodoffers a promising result and outperforms the existing methods in terms of the natural sceneclassification.

1.3 BTC

BTC means Block Truncation Coding. It is an image compression method which requires simple process on both encodinganddecodingstages.TheBTCcompressesanimage in a similar and efficient way. BTC firstly divides an input image into several blocks and each block is represented with two specific quantizers to maintain its mean value. The BTC is used in CBIR because of its simplicity andstability.

I. MOTIVATION

As a result of recent advancements in digital storage technology, it is now possible to create large and extensive databases of digital imagery. These collections may contain millionsofimagesandterabytesofdata.Foruserstomakethe most of these databases effective, efficient methods of searching must be devised. Prior to automated indexing methods, image databases were indexed according to keywords that were both decided upon and entered byahuman categorizer. Unfortunately, this practice comes with two very severeshortcomings.

First, as a database becomes increasingly large the manpower required to index each image becomes less practical. Secondly, two different people, or even the same person on two different days, may index similar images inconsistently. The result of these inefficiencies is a less than optimal search result for the end user of the system.

2. LITERATURE SURVEY

Table 1: Literature review

SL.NO	TITLE	MERITS	DEMERITS
1	Image retrieval using BDIP and BVLC Moments	• Presented retrieval method yields about 12% better performance	• Less accurate
2	Measurement of colour texture	• This method provide 93.7% accuracy in texture extraction.	.....
3	Texture image retrieval using new rotated complex wavelet filters	• The retrieval accuracy is more. • Improv e textures	.....
4	Content based image retrieval using multiresolution color and texture features	• Higher retrieval accuracy than the other conventional methods	• Complex methods used
5	Texture features for browsing and retrieval of image data	• Higher retrieval accuracy	• Large number of image processing computation

In Table 1, the overall work is being compared with other techniques used in this field to retrieve similar images accordingtotheuser'sdemands.Asaresultofthecomparison of this system with the existing ones, it is proved that the technique used here provides more accurate images in very less time.

3. SCOPE OF THE PROJECT

Content-Based Image Retrieval (CBIR) is an active area of researchsincethepastdecade.Alotofworkisstillbeingdone in this area, which includes various applications such as security, medical imaging, audio and video retrieval. It shows the growing interest of many researchers in this field which resultsinnewtoolsandtechniques.Thispapermainlyfocuses on the key contributions of various researchers in the field of CBIR techniques. Then it discusses some literature gaps found in the adaptation of existing image retrieval techniques to build useful systems. an image retrieval system is presented byexploitingthe ODBTCencodeddata streamtoconstruct the image features, namely Color Co-occurrence and Bit Pattern features. As documented in the experimental results, the proposed scheme can provide the best average precision rate compared to various former schemes in the literature. As a result, the proposed scheme can be considered as a very competitive candidate in color image retrieval application. It alsoincludesthefuturescopeofresearchinthisfield.Content based image retrieval has overcome all the limitations of text based image retrieval by considering the visual contentsof image such ascolor, shape and text. Here CBIR system is successfully implemented by combining three features i.e., color, shape and texture. The main scope of the work is to introduce an improved analysis which can collect the most similar images from the vast collection of databases.

4. PROBLEM STATEMENT

The image retrieval method is searching for a tag that would matchthedescriptivekeywordormetadatathatdescribetothe image. This method is called text based matching of image. The retrieval of images based on their content called Content BasedImageRetrieval.TheCBIRmethodgivestheresultsare far more accurate than image indexing and clustering method. The goal of the content-based image retrieval method is to retrieve more relevant image from a large number of datasets that matches to the query image or given image. The features of the images are extracted using feature vector as well as their valuesandindicesaresavedinthedatabase.Thenallirrelevant items are ideally filter out using the index structure by checking attributes with the query image. The relevant image features are compared to the feature of the query image based on similarity measure and retrieved items are ranked in order of similarity. The problem involves in that it compares the structural similarity of the images using the clustering and indexing method. But when a large number of images are added, it is unable to retrieve the most relevant image similar to the queryimage.

5. PROPOSED SYSTEM

An image retrieval system returns a set of images from a collection of images in the database to meet user's demand with similarity evaluations such as image content similarity, edge pattern similarity, color similarity, etc. The similarity distance is computed and sorted in the ascending order between the query image q and target images in the database, and then the images are returned as a set of retrieved images as defined in [2].The first CBIR system developed using the BTC is pointed out in [6]. An image retrieval system offers anefficient way to access, browse, and retrieve a set of similar images that are used in the real-time applications. A huge number of approaches have been developed to capture the information of imagecontentsbydirectlycomputingtheimagefeaturesfrom an image [1],[4]. The image feature is simply constructed in DCT domain. An improvement of image retrieval in DCT domain is presented in [3], [7], [8], in which the JPEG standard compression is involved to generate the image feature Most of them are dealing with the MPEG-7 visual content descriptor. Including the color descriptors (CD), texture descriptor (TD), and shape descriptor (SD) to establish the international standard for the task. Figure 1. shows the block diagram of this system. Several improvements and enhancements of the BTC scheme was being made in [9], [10], to further reduce the computational complexity, improve image quality, and achieve a higher compression ratio. The descriptors provide a great advantage in the CBIR research field. Some of the important aspects such as sharing the image feature for benchmark database, comparative study between several CBIR tasks, etc. This standard also offers a great benefit in the distributed system. In which the image content descriptor can be remotely modified by the user. In this scenario, the original imageis not necessarily transferred over

different locations, but only the image descriptor is required for modification and recalculation. A new type of CBIR approach is presented in which the spatial pyramid and odorless bag- of-features image representations were employed for recognizing the scenecategoriesofimagesfromahugedatabase.Thismethod offers a promising result and outperforms the former existing methods in terms of the natural scene classification. The method in [5], proposed a new approachfor image classification with the receptive field design and the concept of over-completeness methodology to achieve a preferable result. The block truncation coding (BTC) is an image compression method which requires simple process on both encoding and decoding stages. The BTC compresses an image in a simple and efficient way.BTC divides an input image into several image blocks, and each image block is subsequently represented with two specific quantizers to maintain its mean value and standard deviation identical to the original image block. The ODBTC employed in this method decomposes an image into a bitmap image and two color quantizers which are subsequently exploited for deriving the image feature descriptor. CCF and BPF are the two image features that are introduced in the proposed method to characterize the image contents, The CCF is derived from the two color quantizers, and the BPF is from the bitmapimage.

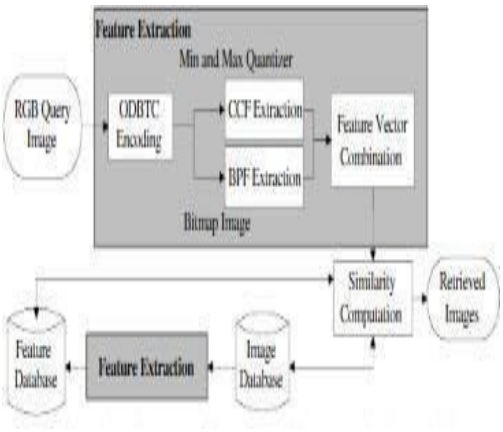

Figure 1: Block diagram of CBIR

Feature extraction methods are very easy, effective and less expensive. Time required is less to find all those similar and related images. More than one related outcome occurs by only one search. CBIR has become a very active in the area of researches mainly in two major research communities, database management and computer visions.

This system not yet have a universally acceptable algorithmic means of characterizing human vision, more specifically in the context of image understanding. Hence it is not surprising to see continuing efforts towards it, either building upon prior work or exploring novel directions. Accuracy is not up to the mark, so continuous filtering is needed for accurate output.

6. RESULTANALYSIS

Process using the Block Truncation Coding technique, where an image is uploaded to get a similar image from the database based on the colour, pattern, resolution etc.. This proposed system can provide the best average precision rate also. This is mainly to get the accurate image. The system will help to retrieve image accurately and also ensures safe retrieval of images. Security of the proposal is formally analyzed and additional experimental evaluation of implemented prototypes revealed that this approach achieves an interesting trade-off between precision and recall in CBIR, while exhibiting high performance and scalability when compared with alternative solutions. An interesting future work direction is to investigate the applicability of this methodology - i.e. the separation of information contexts when processing data in other domains beyond image data.

The texture filter functions provide a statistical view of texture based on an image histogram. These functions are able to provide information about the texture of an image but not about its spatial information. Figure 2 shows the comparison of accuracy of various algorithms used in CBIR. Grey Level Co-Occurrence Matrix (GLCM) is an algorithm or a method which considers the spatial relationship of pixels. Accuracy level of GLCM I the work is 87%. Edge Based Segmentation (EBS) is a technique which checks for the similar images based on the edgefeaturesonaninputimage.EBS'saccuracyis only69%. Region Based Segmentation (RBS) is a technique in image processing field which is used to convert the image into various segments, with an accuracy of 78%. Colour Co- Occurrence Feature (CCF) is an image texture filtering technique based on colour of the image used to index and characterize the contents of images. Here, accuracy level of CCF is 89%. Gabor wavelet is one of the most widely used filters for the purpose of image feature extraction with an accuracy of 78%. Convolutional neural network (CNN) in deep learning ,is a class of deep neural networks which is very efficient in areas like image recognition and classification. CNN is being used successfully in identifying or recognition of objects and faces. In this work CNN stands with an accuracy of about 95%. Red Green Blue (RGB) is a colour format that is used in the field of image processing.

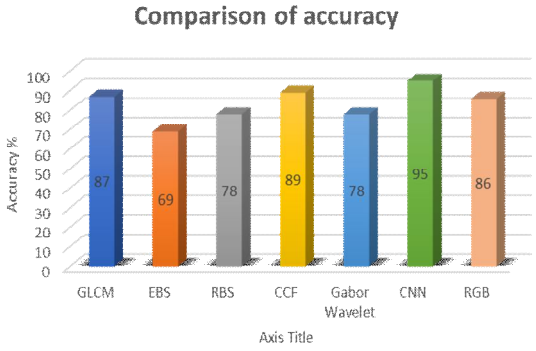

Figure 2: Experimental analysis of accuracy

7. CONCLUSION AND FUTURESCOPE

Content-based image retrieval (CBIR) is currently an active research area in the computer vision community. Unfortunately, there are only few CBIR systems that can handle e-comics. All of the data of e- comics are available as multimedia documents. Content based image retrieval to specifically handle digital comics. In this project a CBIR system which demonstrates face detection and recognition techniques to allow the retrieval of comic images from queries of comic characters will be presented.

The main scope of CBIR system is detection and recognition of comic characters. In this paper a new secure framework for the privacy- preserving outsourced storage, search, and retrieval of large-scale, dynamically updated image repositories areproposed. In the basis of the framework it is a novel cryptographic scheme, specifically designed for images, named IES-CBIR.Key to its design is the observation that in images, color information can be separated from texture information, enabling the use of different encryption techniques with different properties for each one, and allowing privacy preserving content-based image retrieval to be performed by third-party, untrusted cloud servers.

ACKNOWLEDGEMENT

First of all, we thank the Almighty God for giving us the strength for this successful venture. We take this opportunity to extend our sincere thanks to all who helped and guided us in the completion of this work. We express our gratefulness to the management of Mangalam Collee of Engineering and Engineering for letting us to make use of the facilities available in the department. We would like to thank all the teaching and non-teaching staffs who were included in the successful completion this work. Finally, we extend our sincere thanks to all our friends and family members for their presence and constant support provided by them.

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