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Content-Based Image Retrieval Using Features Extracted From Halftoning-Based Block Truncation Coding

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Abstract — *This technology presents a technique for content-based image retrieval (CBIR) by misusing the benefit of low complexity ordered dither block truncation coding (ODBTC) for the generation of image content descriptor. In the encoding step, ODBTC packs a picture hinder into relating quantizers and bitmap picture. Two picture elements are proposed to list a picture, in particular, color co-occurrence feature (CCF) and bit pattern features (BPF), which are created specifically from the ODBTC encoded information streams without performing the disentangling procedure. The CCF and BPF of a picture are essentially gotten from the two ODBTC quantizers and bitmap, individually, by including the visual codebook. Experimental results show that the proposed method is superior to the block truncation coding image retrieval systems and the other earlier methods, and thus prove that the ODBTC arrangement is not simply suited for picture weight, because of its ease, also offers a direct and fruitful descriptor to rundown pictures in CBIR system.*

Keywords- *Bit pattern feature, color co-occurrence feature, content-based image retrieval, ordered dither block truncation coding.*

I. INTRODUCTION

A signification amount of research efforts have been devoted in addressing the Content Based Image Retrieval (CBIR) problem. An image retrieval system returns a set of images from a collection of images in the database to meet users' demand with similarity evaluations such as image content similarity, edge pattern similarity, color similarity, etc. A picture recovery system offers an efficient approach to get to, scan, and recover an arrangement of comparative pictures in the constant applications. A few methodologies have been produced to catch the data of picture substance by straightforwardly figuring the picture highlights from a picture as reported in. In the picture highlight is essentially developed in DCT space. A change of picture recovery in DCT area is displayed in, in which the JPEG standard pressure (barring the entropy coding) is included to produce the picture highlight. Some endeavors have been tended to depict the visual picture content. The majority of them are managing the MPEG-7 Visual Content Descriptor, including the Color Descriptors (CD), Texture Descriptor (TD), and Shape Descriptor (SD) to set up the universal standard for the CBIR errand. This standard gives an awesome favorable position in the CBIR research field, in which some critical angles, for example, sharing the picture highlight for benchmark database, similar study between a few CBIR undertakings, and so forth., turn out to be moderately simple to be led utilizing these standard elements. The standard likewise offers an incredible benefit in the dispersed system, in which the picture content descriptor can be remotely modified by the client. In this situation, the first picture is a bit much exchanged over various areas, but rather just the picture descriptor is required for modification and recalculation. Another kind of CBIR methodology is exhibited in, in which the spatial pyramid and orderless pack of-components picture representation were utilized for perceiving the scene classes of pictures from an enormous database. This strategy offers a promising result and beats the previous existing techniques as far as the regular scene classification. The strategy in introduced the comprehensive representation of spatial encompass with a low dimensionality for speaking to the scene picture. This methodology shows a remarkable result in the scene arrangement. The strategy in proposed another methodology for picture classification with the responsive field outline and the idea of over-culmination technique to accomplish a best result. As reported in, this strategy accomplished the best classification execution with much lower highlight dimensionality contrasted with that of the previous plans in picture classification undertaking.

The CBIR system which separates a picture highlight descriptor from the packed information stream has turned into a critical issue. Since the greater part of the pictures are recorded in the capacity gadget in packed configuration for decreasing the storage room prerequisite. In this situation, the element extractor basically creates a picture highlight for the CBIR undertaking from compacted information stream without performing the translating (decompression) process. The Block Truncation Coding (BTC) is a picture pressure technique which requires straightforward procedure on both encoding and unraveling stages. The BTC packs a picture in a basic and efficient way. BTC firstly isolates an information picture into a few picture pieces, and every picture square is in this manner spoke to with two specific quantizers to keep up its mean worth and standard deviation indistinguishable to the first picture square. The BTC produces two quantizers, to be specific high and low quantizers, and a bitmap picture toward the end of the deciphering procedure. The BTC deciphering performs the converse system by basically supplanting the bitmap data with the high or low quantizers. BTC never requires assistant data amid encoding and interpreting stages, for example, the codebook data in the Vector Quantization (VQ) picture pressure or the quantization table in JPEG. The BTC keeps up adequate visual picture, and the span of the information stream can be further lessened utilizing the entropy coding.

II. LITERATURE REVIEW

1) Image compression using block truncation coding
AUTHORS: Doaa Mohammed
Description: The present work investigates image compression using block truncation coding. Two algorithms were selected namely, the original block truncation coding (BTC) and Absolute Moment block truncation coding (AMBTC) and a comparative study was performed. Both of two techniques rely on applying divided image into non overlapping blocks. They differ in the way of selecting the quantization level in order to remove redundancy. Objectives measures were used to evaluate the image quality such as: Peak Signal to Noise Ratio (PSNR), Weighted Peak Signal to Noise Ratio (WPSNR), Bit Rate (BR) and Structural Similarity Index (SSIM).The results have shown that the ATBTC algorithm outperforms the BTC. It has been show that the image compression using AMBTC provides better image quality than image compression using BTC at the same bit rate. Moreover, the AMBTC is quite faster compared to BTC.

2) BTC image coding using vector quantization
AUTHORS V. Udpikar and J. Raina
Description: This paper presents a review of vector quantization algorithmsused for the designing of the codebook to obtain better quality of the image with minimum distortion. First, the concept of vector quantization is introduced and then different algorithms such as Linde-Buzo-Gray (LBG) algorithm, Equitz nearest neighbor (ENN) algorithm,Back propagation neural network(BPNN) algorithm and fast back propagation(FBP) algorithm are reviewed.

3. BTC-VQ-DCT hybrid coding of digital images
AUTHORS: Y. Wu and D. C. Coll
Description: A hybrid BTC-VQ-DCT (block truncation coding, vector quantization, and discrete cosine transform) image coding algorithm is presented. The algorithm combines the simple computation and edge preservation properties of BTC and the high fidelity and high-compression ratio of adaptive DCT with the high-compression ratio and good subjective performance of VQ, and can be implemented with significantly lower coding delays than either VQ or DCT alone. The bit-map generated by BTC is decomposed into a set of vectors which are vector quantized. Since the space of the BTC bit-map is much smaller than that of the original 8-b image, a lookup-table-based VQ encoder has been designed to `fast encode' the bit-map. Adaptive DCT coding using residual error feedback is implemented to encode the high-mean and low-mean subimages. The overall computational complexity of BTC-VQ-DCT coding is much less than either DCT and VQ, while the fidelity performance is competitive. The algorithm has strong edge-preserving ability because of the implementation of BTC as a precompress decimation.

4. Hybrid block truncation coding
AUTHORS: C. S. Huang and Y. Lin
Description: A hybrid block truncation coding (BTC) is presented. In the hybrid BTC, a universal codebook using Hamming codes and a differential pulse code modulation (DPCM) are employed, respectively, to the bit plane and the side information of BTC to reduce coding rate. Simulation results reveal that the performance of the proposed algorithm is only slightly worse than that of the hybrid BTC using vector quantization (VQ) techniques, but with much lower computational or hardware complexity.

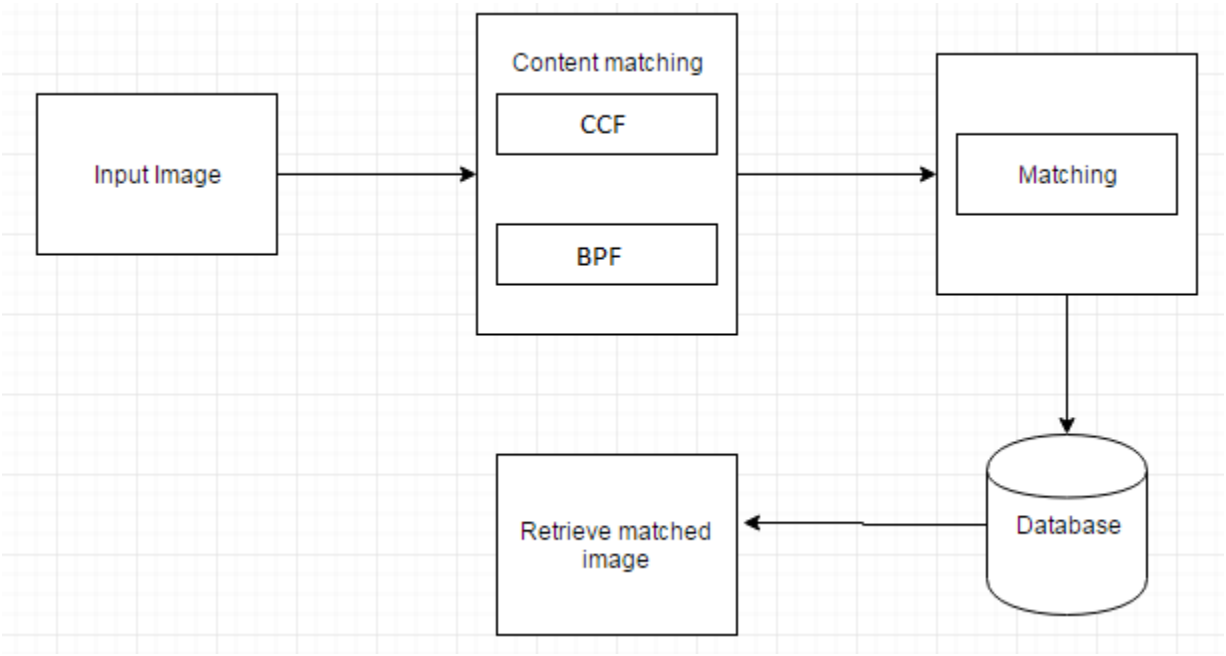
5. An efficient BTC image compression technique
AUTHORS: P. Lee, and W. Lou
Description: This paper presents a moment preserving and visual information dominance technique to achieve the low-bit rate block truncation coding (BTC). Compared with other existing strategies as transform coding and vector quantization, conventional BTC compression has the advantage of simple and fast computation. Nevertheless the compression ratio is limited by its low efficiency. Our proposed technique accomplishes the goal of simple computation with variable bit rate selection by the moment preservation and information extraction algorithm. The proposed technique has the advantage of simple operations and it does not require complicated mathematical computations. Thus, the overall computation does not increase the burden compared with ordinary BTC. The simulations are carried with natural images to evaluate the performance

III. SURVEY OF PROPOSED SYSTEM

This technology to examine the performance of the technical methods in the CBIR system as well as in the image classification task, These image databases contain various textural and natural images of different appearance in the grayscale and color space with different image sizes. All images in the databases are divided into several image classes' semantic categories), in which all images under the same categories are regarded as similar images. For example, Corel image database consists of 1000 natural images grouped into 10 classes, in which each class contains 100 images. All

images are of size 384×256clusteredinto several semantic categories such as people, beach, building, buses, dinosaurs, elephants, flowers, horses, mountains, and foods.
In existing system we get all irrelevant result, which is not useful for user, In our system we can get the relevant result.

IV. SYSTEM ARCHITECTURE



V. MATHEMATICAL MODEL

Let S is the Whole System Consist of

S= {I, P, O}

I = Input.

I = {U, Q, IMG,}

U = User

U = {u1,u2….un}

Q = Query Entered by user

Q = {q1, q2, q3…qn}

IMG = Image.

IMG = {img1, img2….imgn}

P = Process:

P = {ODBTC, CCF, BPF, FVC, SC}

Steps1: User provides image(RGB format)

Step2: **ODBTC Encoding**:

The binary vector quantization produces a representative bit pattern codebook
from a set of training bitmap images obtained from the ODBTC encoding process.
Step2: **CCF extraction:**

The color distribution of the pixels in an image contains huge amount of information about the image contents. (CCF) can be derived from the color co-occurrence matrix.
Step3: **Bit Pattern Feature (BPF) Extraction:**

Bit Pattern Feature (BPF), characterizes the edges, shape, and image contents.

Step4: **Feature Vector Combination:**

The query image is firstly encoded with the ODBTC, yielding the corresponding CCF and BPF. The two feature are later compared with the features of target images in the database.
Step5: Feature Extraction on image from Image Database.

Step6: **Similarity Computation (SC):** Comparison between provided image by user and image from Image Database.

Step7: Retrieved image will be displayed to the user.

OUTPUT: Retrieved image is the output of the system as per user query.

VI. RESULT ANALYSIS

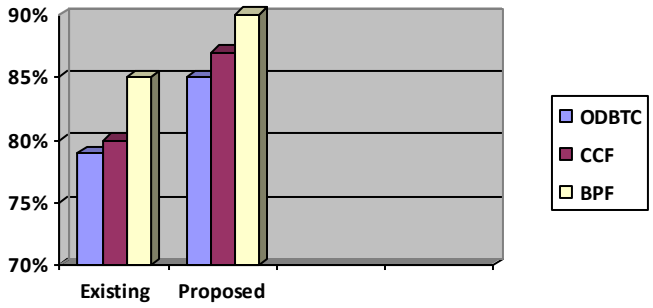
A. Expected Result:-

1. Compare Exisiting Vs Proposed w.r.t Performance

   a. Tabular Representation:

Remarks	Existing	Proposed
ODBTC	79%	85%
CCF	80%	87%
BPF	85%	90%

   b. Graphical Representation:



VII. CONCLUSION AND FUTURE WORK

An image retrieval system is presented by exploiting the ODBTC encoded data stream to construct 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. For the further studies, the proposed image retrieval scheme can be applied to video retrieval. The video can be treated as sequence of image in which the proposed ODBTC indexing can be applied directly in this image sequence. The ODBTC indexing scheme can also be extended to another color space as opposed to the RGB triple space. Another feature can be added by extracting the ODBTC data stream, not only CCF and BPF, to enhance the retrieval performance. In the future possibilities, the system shall be able to bridge the gap between explicit knowledge semantic, image content, and also the subjective criteria in a system for human-oriented testing and assessment.

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AUTHORS

