

Content-Based Image Retrieval System Using Halftoning Based BTC

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Abstract- The Image Retrieval system is implementing antecedently on varied parameters likewise an image retrieval system returns a collection of images from a set of images within the information to fulfill user's demand with image content similarity, edge pattern similarity, color similarity, etc. within the existing system varied algorithmic program is use like compression algorithmic program, Image concealment algorithmic program for Watermaking, Block Truncation secret writing, Clifford pure mathematics that is employed to outline color alteration, Block truncation algorithmic program, Digital Image process, Block improvement and Arithmetic secret writing supported bar chart, BTC with different color house, Data-Driven parallel Implementation with BTC, VQ codeword search Technique. A picture retrieval system offers AN economical thanks to access or retrieves a collection of comparable pictures by directly computing the image options from an image as according by exploitation totally different styles of techniques also as algorithms. Just in case of projected system, image retrieval is given by exploiting the ODBTC encoded information stream to construct the image options, specifically Color Co-occurrence and Bit Pattern options.

Keywords: Digital Halftoning, Image Compression Algorithm, EBTC.

1. INTRODUCTION

An image revival system returns a collection of images from a set of pictures within the information to fulfil the user's necessities that evaluates the options like image content, edge pattern correspondence, color similarity, etc. an image retrieval system offers associate degree economical thanks to access, browse, and recovers a collection of comparable images within the period applications. Many approaches are developed to capture the knowledge of image contents by directly computing the image characteristics from an image as reported in information during this survey, the projected system is compared with previous existing system within which contains various existing techniques. In system titled as Color Image clump victimisation Block Truncation Algorithm the strategy for earlier image retrieval system centered on "search-by-query" approach. The user provides associate degree example image for the question, that the information is searched thoroughly for pictures that are most similar. Clump may be a technique of grouping knowledge objects into totally different teams, specified similar knowledge objects belong to an equivalent cluster and dissimilar knowledge objects to totally different clusters. The next existing system is "Enhancement of coloured pictures in Digital Image Processing" within which the generic data was pre-processed, normalized and so information points are clustered victimization Fuzzy C suggests that technique.

2. LITERATURE SURVEY

2.1 Existing System

System 1: Dr. Sanjay Silakari, Dr. Mahesh Motwani, Proposed the System Color Image Clustering using Block Truncation Algorithm.

Method:

The image information hold raw image information can't be directly used for retrieval. Raw image information have to be compelled to be processed and descriptions supported the properties. The strategy for earlier image retrieval system centered on "search-by-query". The user come back up with Associate in Nursing example image for the question, that the information is searched thoroughly for pictures that square measure most identical. Agglomeration is that the technique of grouping information objects into completely different teams, such similar information objects belong to constant cluster and dissimilar information objects to completely different clusters. Image agglomeration consists of 2 steps:

1. The former is feature extraction
2. Grouping.

For every image in an exceedingly info, a feature vector seize sure essential properties of the image is computed and keep in an exceedingly feature base. Agglomeration algorithmic program is applicable over this extracted feature to make the cluster.

System 2: Ramanpreet Kaur, Sukhpreet Kaur, proposed the system Enhancement of Colored Images in Digital Image Processing.

Method:

Image mining is that the activity of looking and discovering the information from information. sweetening of coloured pictures is predicated on the visual content of the Image. wise options may be extracted supported the visual content of the Image. Color, texture, pattern, image topology, form of the objects and their layouts and locations inside the image, etc area unit the premise of the Visual Content of the Image and that they indexed. Generic Feature Extraction for categorization exploitation Fuzzy C suggests that bunch. The data was pre-processed, normalized and so information points area unit clustered exploitation Fuzzy C suggests that capability. Feature vectors for all the categories area unit generated by extracting the foremost relevant options from the correlate with clusters and used for additional classification.

System 3: The Authors Subarna Dutta, Aditya Abhinav, Partha Dutta, Purushottam Kumar, Amiya Halder proposed the system An Efficient Image Compression Algorithm Based on Histogram Based Block Optimization and Arithmetic Coding.

Method:

In this system, Associate in Nursing economical rule has been planned for lossy image compression/decompression theme victimisation bar chart based mostly block improvement and arithmetic cryptography. In a picture there's usually a chance of high correlation between pixels. Such correlations between pixels or a block of pixels area unit avail oneself of to sensible advantage to realize compression. during this paper, $M \times N$ image is considered that's, there area unit M range of rows every has N pel values. the essential approach in block improvement is for every block within the image one changed pel price is generated and is stockpile in compressed file resulting in compression. however the downside of this technique is a few quantity of knowledge loss within the decompressed file. The planned algorithmic rule cushion this loss to some extent by taking bar chart primarily based block improvement. this system takes a block into account and sweepstakes a bar chart of the block. bar chart provides the entire no. of pixels appointed to each grey level. Then the height of the bar chart is observed. This peak represents the element price that's continual multiple variety of times within the block. This element price is then hold on for the block in compressed file resulting in compression further as reduced loss whereas decompression as compared to averaging primarily based block improvement.

System 4: Author H .B Kekre Implements the system as Image Classification using Block Truncation Coding with Assorted Color Spaces.

Method:

The paper depicts comprehensive performance comparison of image classification techniques victimisation block truncation writing (BTC) with inclusive color areas. Inclusive six color areas are explored which incorporates RGB color house for applying BTC to find out the feature vector in Content based mostly Image Classification (CBIC) techniques. The results expressly reveal performance refinement (higher average success rate values) with planned color-BTC ways with light hue color areas compared to RGB color house. Best result's shown by YUV color house based mostly } BTC in content based image classification.

System 5: An Adaptive Block Truncation Coding Scheme and Its Data-Driven Parallel Implementation.

Method:

The projected cryptography algorithmic rule is predicated upon the consummate moment block truncation cryptography (AMBTC). AMBTC calculates the mean of each of the block and so performs a 2 level division .In order to enhance the image quality, a AMBTC-based cryptography theme has been chronicled. 1st of all, so as to derive a more

robust trade off between reconstructed quality and procedure complexness, the projected theme instigates a 3 level classification technique. Compared to the previous two-level classification technique the projected 3 level classification technique allows additional ability in encoding/decoding a picture. Moreover, to additional improve the compression potency, differential pulse cryptography modulation (DPCM) is used within the current theme. DPCM is create use to get rid of the unwanted data existing in neighboring block pictures among an even image.

2.2 Proposed System

Block truncation cryptography may be a lossy sort of compression. In block truncation cryptography (BTC), the initial image is split into fixed-size non overlapping blocks of size $M \times N$. The block size chosen is sometimes tiny to avoid the sting blurring and interference impact. Every block is severally coded employing a 2 level (1-bit) quantizer. the 2 values preserve the primary and also the moment characteristic of the initial block. BTC doesn't offer a better gain than any of the trendy image compression algorithms like JPEG or JPEG-2000, however it's abundant lesser complicated. Digital Halftoning may be a technology of changing a nonstop tone image to a 2 tone image.

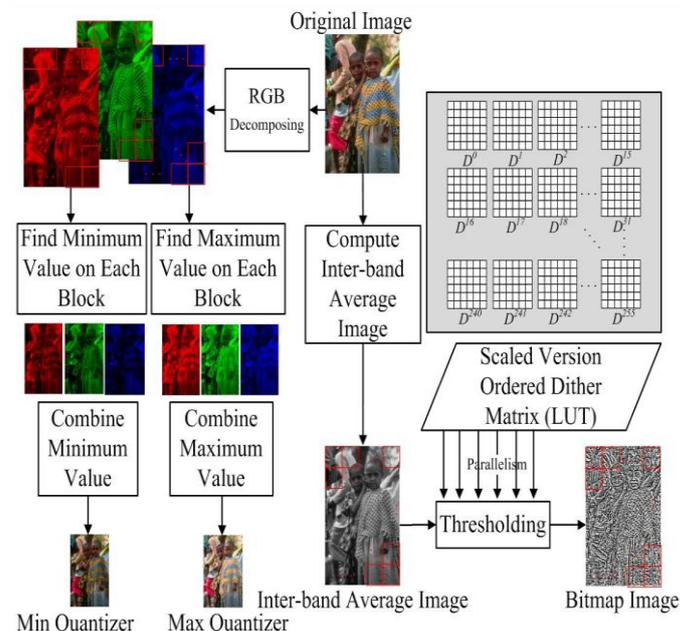


Fig.1 Block diagram of the proposed ODBTC encoding for a color image.

3. METHODOLOGY

This section consist of Methodology with respect to each objective is briefly given below:

3.1. Color Co-Occurrence Feature (CCF):

Color Co-occurrence Feature (CCF) can be derived from the color co-occurrence matrix.

Step 1: CCF is computed from the two ODBTC color quantizers. The minimum and maximum color quantizers are firstly indexed using a specific color codebook.

Step 2: Color indexing process on RGB space can be defined as mapping a RGB pixel of three tuples into a single tuple.

Step 3: The codebooks generated from the minimum quantizer, and maximum quantizer, respectively.

Step 4: There are three channels from that we select minimum quantizer and maximum quantizer in color indexing.

Step 5: From this color indexing matrix we can compute CCF.

3.2. Bit Pattern Feature (BPF):

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

Step 1: The binary vector quantization produces a representative bit pattern codebook from a set of training bitmap images.

Step 2: Bit pattern codebooks are generated using binary vector quantization.

Step 3: Bit Pattern indexing is generating from bitmap images and bit pattern codebook.

Step 4: From Bit Pattern indexing it compute Bit Pattern Feature.

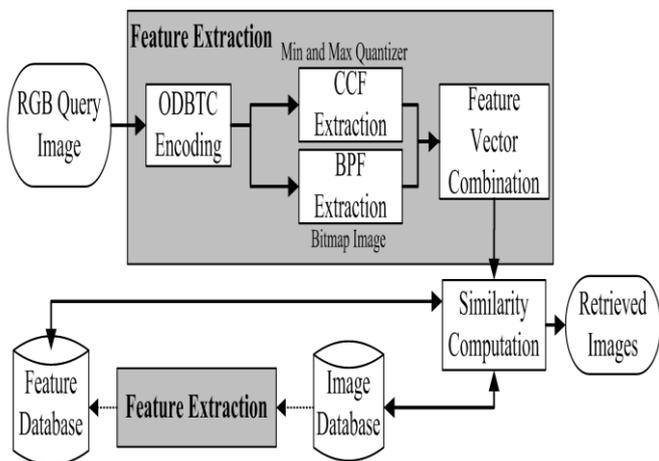


Fig 2: Block diagram of the proposed image retrieval method.

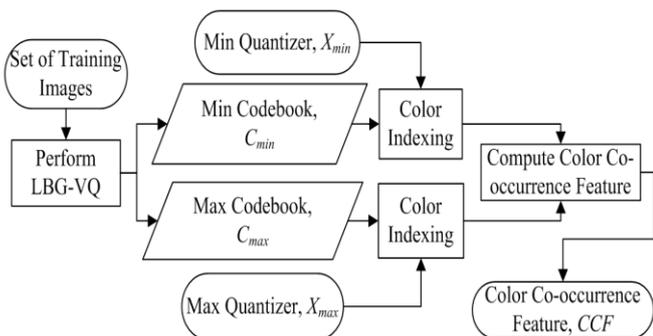


Fig 3: Block diagram for computing the color co-occurrence feature.

4. EXPERIMENTS

Three quantitative evaluations are used to examine the performance of proposed method, i.e., precision, recall, Average Retrieval Rate (ARR)

The average precision $P(q)$ and average recall $R(q)$ measurements for describing the image retrieval performance are defined in as below:

1. Precision

$$P(q) = \frac{1}{N_t L} \sum_{q=1}^{N_t} n_q \quad (L)$$

2. Recall

$$R(q) = \frac{1}{N_t N_R} \sum_{q=1}^{N_t} n_q \quad (L)$$

3. Average Retrieval Rate

$$ARR = \frac{1}{N_t N_R} \sum_{q=1}^{N_t} n_q \quad (N_R)$$

Table 4.1: Values of Precision and Recall as below:

Category	Precision		Recall	
	proposed	Existing	proposed	Existing
Dinosaur	0.92	0.88	0.72	0.71
Bus	0.88	0.76	0.67	0.66
Rose	0.83	0.81	0.65	0.63
Building	0.68	0.64	0.64	0.58
Elephant	0.43	0.56	0.60	0.53
Horse	0.58	0.56	0.53	0.48
Beach	0.53	0.51	0.51	0.49
People	0.50	0.56	0.58	0.54
Mountain	0.44	0.40	0.45	0.41
Food	0.42	0.37	0.44	0.39

Above table shows the comparison between proposed and existing system i.e. values of Precision and Recall of proposed and existing system.

Graph

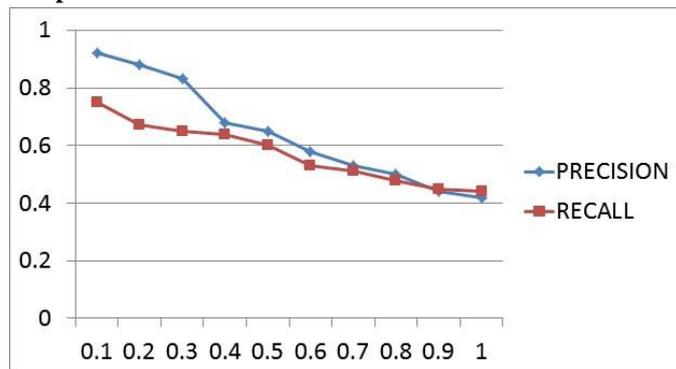


Figure 4.2: Proposed graph of Precision and Recall

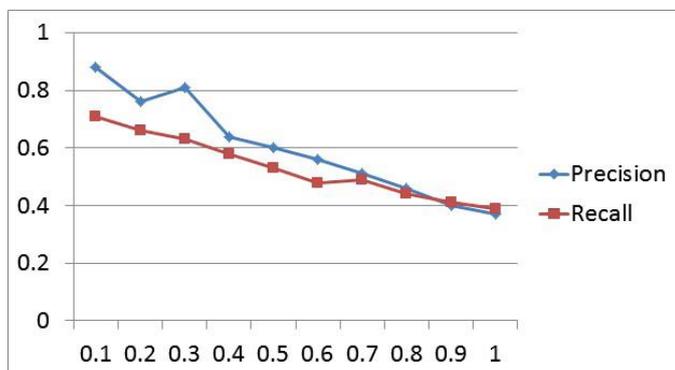


Figure 4.3: Existing graph of Precision and Recall

5. CONCLUSIONS

In the existing system completely different rule is employed like compression rule, Image concealment rule for Watermarking, Block Truncation committal to writing, Clifford pure mathematics that is employed to outline color alteration, Block truncation rule, Digital Image process, Block improvement and Arithmetic committal to writing supported bar chart, BTC with different color area, Data-Driven parallel Implementation with BTC, VQ codeword search Technique. In projected system, an image retrieval system is bestowed by exploiting the ODBTC encoded knowledge stream to construct the image options, particularly Color Co-occurrence and Bit Pattern options. As documented within the experimental results, the projected theme will offer the most effective average preciseness rate compared to varied former schemes within the literature. As a result, the projected theme are often thought-about as a really competitive candidate in color image retrieval application. Halftoning algorithmic program is straightforward and improves the performance of pictures as compared to different algorithms.

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