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Multichannel Decoded Local Binary Pattern for Content-Based Image Retrieval

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ABSTRACT: Image indexing and retrieval is demanding more and more attention due to its rapid growth in many places. Image retrieval has several applications such as in object recognition, biomedical, agriculture, etc. The aim of Content Based Image Retrieval (CBIR) is to extract the similar images of a given image from huge databases by matching a given query image with the images of the database. Matching of two images is facilitated by the matching of actually its feature descriptors. We propose a novel method for image retrieval with Histogram of gradient and gray level co-occurrence matrices for each channel. Image retrieval experiments are performed to observe the effectiveness of the proposed approach using Matlab tool.

KEYWORDS: Content Based Image Retrieval (CBIR), Object recognition, Histogram of gradient, Multichannel decoded LBPs

I. INTRODUCTION

Content-based image retrieval (CBIR) is the process by which one searches for like images according to the content of the query image, such as colour, texture, shape, and so forth. The field of organizing and searching images based on their content rather than image annotations [1]. Retrieval of images based not on keywords or annotations but based on features extracted directly from the image data [2]. Image indexing and retrieval techniques which use image stuffing, that is, low-level (earliest) features of an image, such as colour, shapes, textures, and so on. Queries are also provided in a form of images [3].This approach retrieves otherwise searches digital images from enormous dataset using the content of the images themselves or syntactical image features without human intervention. Other terms used interchangeably for CBIR are query by image content (QBIC) and content-based visual information retrieval (CBVIR) [4]. CBIR also known as query by image content (QBIC) & content-based image information retrieval (CBVIR) be the application of computer vision techniques to the image retrieval issues, that is, the problem of penetrating used for digital images in huge databases [5]. "Content-based" means the investigator will examine the actual contents of the image. The term 'content' in this perspective may pass on colours, shapes, textures, or any other information that can be resultant from the image itself [6].

II. REGION APPROACH CONTENT BASED IMAGE RETRIEVAL

The novel method for image description with multichannel decoded LBPs. We launch adder- and decoder-based two schemas for the grouping of the LBPs from more than one channel. Image recovery experiments are performed to observe the efficiency of the proposed approaches and compared with the existing ways of multichannel techniques. It is observed that the introduced multi channel adder- and decoder- based LBPs significantly improve the retrieval

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performance over every database and outperform the other multichannel-based approaches in terms of the average retrieval precision and average retrieval rate.

MATLAB handles images as matrices. This involves breaking each pixel of an image down into the fundamentals of a matrix. MATLAB distinguishes sandwiched between colour and gray scale images and therefore their resulting image matrices differ slightly Image queries into three levels of generalization: ancient features such as colour or shape, logical features such as the identity of objects shown and abstract attributes such as the significance of the scenes depicted.

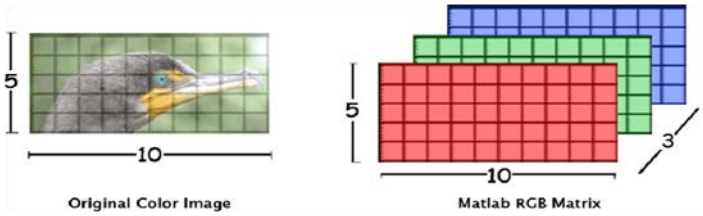

Fig:1 Colour Image Representation And RGB Matri

A gray scale image is a mixture of black and white colours. These colours, or as some may term as ‘shades’, are not composed of Red, Green or Blue colours.

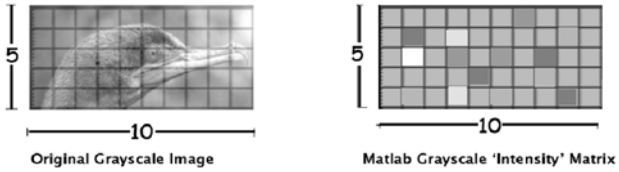

Fig:2 Gray scale Image Representation

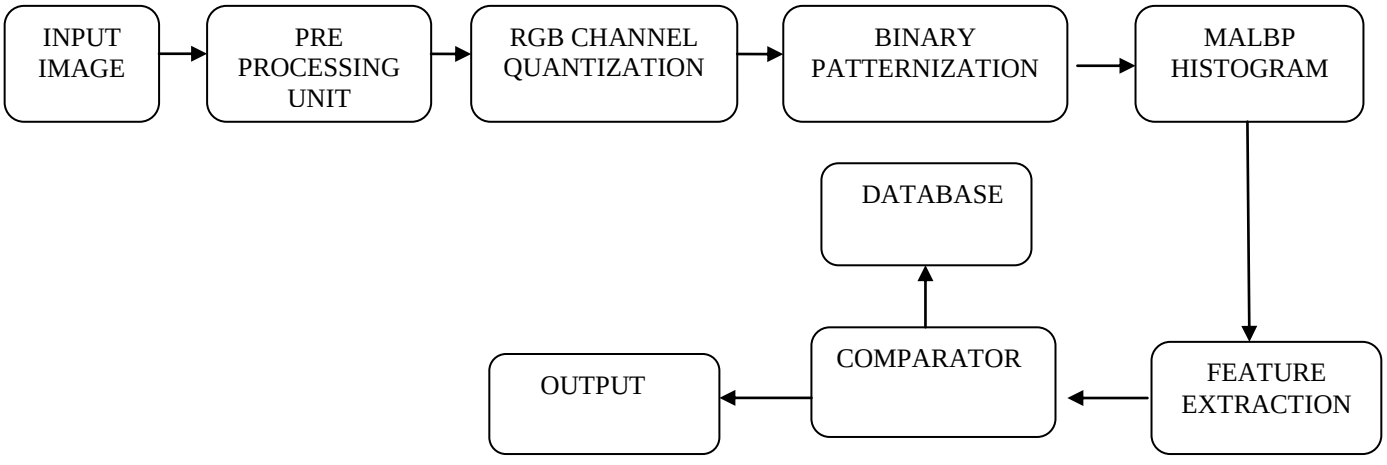

Fig: 3Architecture for content based Image Retrieval.

III. PRE-PROCESSING

Pre-processing step make the background consistent and then convert the image into a binary image. It involves three stages

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1. Input Image Resize
2. RGB to Gray scale conversion
3. Removing Noise

1. INPUT IMAGE RESIZE

The sample input image is shown below. We can fix the dimension of the image to be 256X256 for the image analysis and feature extraction.

Fig:4 Sample Input Image and Resized Image

2. RGB TO GRAY SCALE CONVERSION

The pre processing output for RGB images is shown below, occasionally referred to the same as a factual colour figure, is stored in MATLAB as a m-by-n-by-3 data collection that defines red, green, and blue colour apparatus for each personality pixel. The colour of each pixel is determined by the combination of the red, green, and blue intensities stored in each colour plane at the pixel's location.

Fig: 5 RGB Image

3. REMOVING NOISE

The median filter is a nonlinear digital filtering procedure, often used to eliminate noise. The value of an output pixel is determined by the median of the neighboring pixels. To run a median filter:

1. Consider each pixel in the image.
2. Arrange the neighbouring pixels into order based upon their intensities.
3. Substitute the unique value of the pixel with the median value from the list.

IV. SEGMENTATION

Image segmentation is the process of partition a digital figure into numerous segments. The goal is to segment the main objects out of an image using a segmentation method based on graph cuts. We compute the mincut /maxflow of a graph.

Graph Cut Algorithm

Graph cut algorithms are successfully applied to a wide range of harms in visualization and graphics. We use the minimum cut and maximum cut method in graph cut algorithm to solve the segmentation problem.

1. Conversion of RGB color to gray scale image.
2. Compute matrices Weight & Diagonal (W & D) .In this method we use eigen values and eigenvectors to come across out the cut in the graph that way to find out the week limits in the image.

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3. Work out the equation intended for receiving eigenvectors and smallest eigen values.
4. Use the eigenvector with the subsequent smallest eigen value to bipartition the graph.
5. Recursively separation the segmented parts if it is essential. After we cut the graph we need to cut the two parts of the image if it is necessary to cut.

The components of these models are the hue represents the chromatic element in this model and it is the definition of a colour by the combination of the primary colours. Saturation refers to the prevalence of a particular hue in a colour. The value of a colour refers to the intensity (the lightness or the darkness of the colour) .

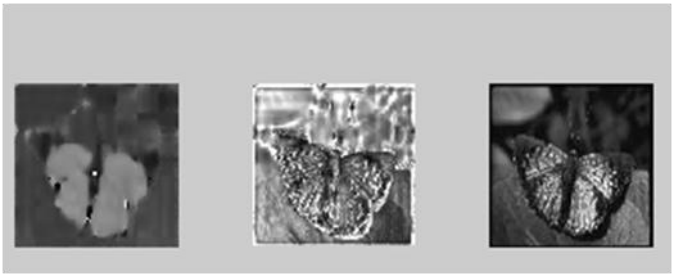

Fig: 6 Segmentation output for sample image
1. Hue 2.Saturation 3.Intensity

V. FEATURE EXTRACTION MODULE

Feature extraction involves reducing the quantity of property required to describe a large set of data.

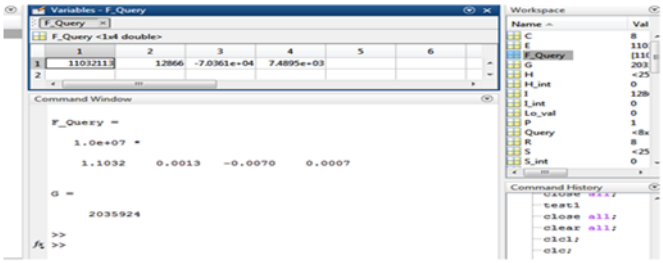

Fig: 7 Feature extraction output

GLCM ALGORITHM

GLCM provides intensity information of the image. It defines the spatial relationship of pixels in the image. The Contrast, Correlation, Energy, Homogeneity are the parameters measured using GLCM. The GLCM algorithm is as follow

1. Add up all pairs of pixels in which the early pixel has a value i, and its matching pair displaced from the first pixel by d has a value of j.
2. This count is entered in the ith row and jth column of the matrix d[i,j].
3. Note down that Pd[i,j] is not symmetric, because the number of pairs of pixels having gray levels[i,j]does not essentially equal the number of pixel pairs having gray levels [j,i].
4. The elements of Pd[i,j]can be normalized by dividing each entry by the total number of pixel pairs.
5. Normalized GLCM N[i,j] is calculated.

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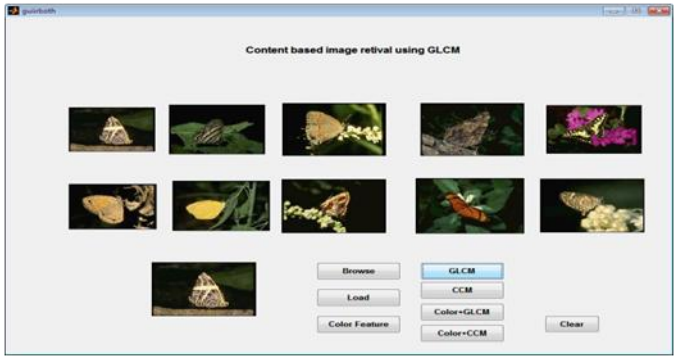

Fig: 8 GLCM features based Image retrieved

CCM ALGORITHM

1. An image with different pixel values will produce a co-occurrence matrix, for the given offset. The offset, is a position operator that can be applied to any pixel in the image.
2. The value of the co-occurrence matrix gives the number of times in the image and pixel values occur in the relation given by the offset.
3. For an image with different pixel values, the co-occurrence matrix C is defined over an image I, parameterized by an offset .

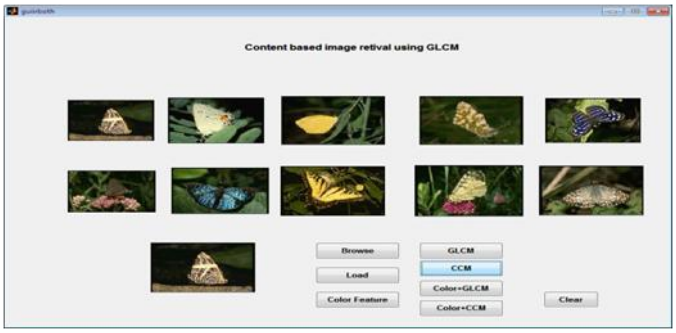

Fig: 9 CCM based image retrieved

COLOR &GLCM

Fig 10 shows the result for combination of colour features and gray level co-occurrence matrix. According to the HSV (Hue, Saturation, Value) color space, the work of color feature extraction is finished, the process is as follows: 1.Quantifying the color space in non-equal intervals 2. Constructing one dimension feature vector and representing the color feature by cumulative histogram. Similarly, the work of texture feature extraction is obtained by using gray-level co-occurrence matrix (GLCM) and color features.

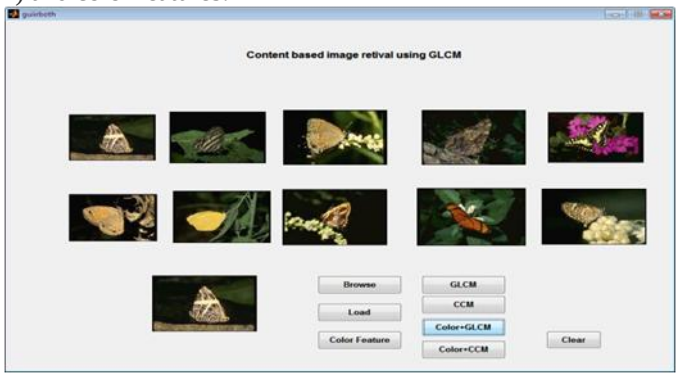

Fig: 10 Colour & GLCM based image retrieved

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COLOR & CCM

Fig 11 shows the result for combination of colour features and colour co- occurrence matrix. image retrieval based on multi-feature fusion is achieved by using normalized Euclidean distance classifier. Through the image retrieval experiment, indicate that the use of colour features and texture based on CCM has obvious advantage. Through the image retrieval experiment, indicating that the use of colour features and texture characteristics of the image retrieval method is superior to a single colour image retrieval method, and colour characteristics combining colour texture features for the integrated characteristics of colour image retrieval has obvious advantages retrieval. Apart from reflecting the CCM texture features, it also reflects the composition of its colour, and improve the performance of image retrieval has important research value.

Fig: 11 Colour & CCM based image retrieved

VI. RESULTS AND CONCLUSION

CBIR project is implemented in Matlab R2013a. When user starts using this system first, they are directed to GUI window where they get an option to select query image want to search and they want to retrieve related images from database which can be seen as shown below figure

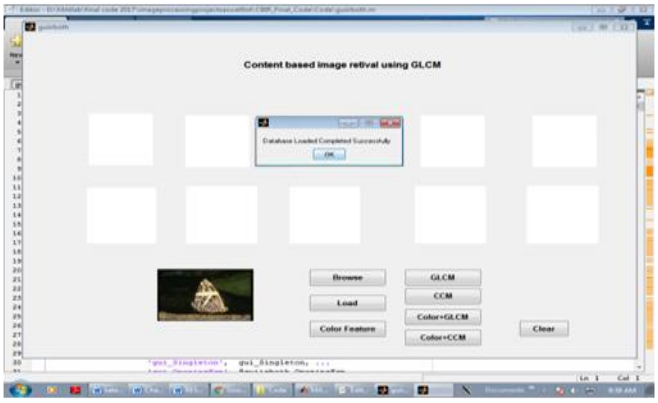

Fig 12: Graphical User Interface Window

The extent to which CBIR technology is presently in everyday use is undoubtedly still very limited. Only in very individual areas such as crime prevention has CBIR technology been adopted to any significant extent. The main functions that a CBIR can be perform in Constructing feature vectors from the figure based on its content and storing it in the database. Similarity comparison and segmentation. Retrieving the images based on the feature vectors.

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