Enhancement of Color Image Retrieval using Adaptive Texture Descriptor

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ABSTRACT

Objective of finding digital images from large database various methods of computer vision techniques of image retrieval are there, out of which Content Based Image Retrieval (CBIR) is widely used. Modern image retrieval systems use content-based image retrieval, as there is increased demand of images in digital format. Nowadays, the latest technique used for image retrieval is content based image retrieval. In digital image processing CBIR is rapidly growing field. In content-based image retrieval method, retrieval of image requires various visual features of image, like- color, shape, texture, etc; so that desired image could be retrieved as per the requirement of user. On the other hand, if we talk about retrieval of image manually from huge set of databases, is time-consuming, laborious and expensive as compared to content-based image retrieval. Therefore, to reduce time for image retrieval we prefer CBIR. In this paper, technique for content-based image retrieval includes texture of data image which is used to calculate energy, contrast and time elapsed of an image using adaptive texture descriptor method. Hence, to increase the enhancement of image, number of features increased for comparison with previous work and value of parameters are also calculated for comparative analysis and on comparing features with stored database time elapsed is also calculated.

General Terms

Feature Extraction, texture descriptor, color histogram, Elapsed time, Energy, Contrast.

Keywords

Graphical user interface (GUI), Content based image retrieval (CBIR), RGB to Gray.

1. INTRODUCTION

In image processing field content-based image retrieval begin to become an important and widely used topic for researches as there is swift increase of digital format in database which consists of images and videos. Content based image retrieval is vital in order to avoid traditional methods (such as image searching based on texts) of image retrieval which are more time-consuming and laborious, and with the help of content-based image retrieval method users could enhance the quality of image or information as per the requirement. In text-based image retrieval, images are retrieved using texts which are also known as metadata of image. As it is manual process of retrieving images, it is more time-consuming and it cannot represent visual contents of image like color, texture and shape etc. [2]. There are chances of inaccuracy and fault in retrieving images as it works manually to interpret every single image. Many complications with text-based access to images results in content-based image retrieval method of image retrieval to overcome. The main focus of CBIR is to abandon the use of text base image retrieval method. CBIR makes the user to handle the data more easily, thereby, making the data user friendly for the user. The quick retrieval of images from large set of databases is achieved with the help of content-based image retrieval. In the process of retrieving the image from large database, system needs to search the images which are to be rationally same as a query images with the help of CBIR [4]. Content based image retrieval methods are used to retrieve an effective and an appropriate image from database. Commonly used content-based image retrieval methods work in a way by extracting low level features such as color, texture, shapes, range to do analysis by comparing the data image with query image. CBIR is also used for calculation of feature vector of characteristics of database image. This feature vector calculations requires query image and feature vector is calculated using CBIR and after that comparing it with the images in database.

1.1 Parameters of Image

In this paper we have done work on various parameters which energy, contrast, time elapsed to retrieve image, histogram and local range and these parameters are discussed below:

1.1.1 Energy/ Entropy

The difference between the contiguous regions of image gives the energy of image. The greater the pixel value or group of pixels of image, the higher the value of entropy of an image. Mathematically, we can say that it is sum of square of elements in gray-level co-occurrence matrix (GCLM).

1.1.2 Contrast

For the enhancement of quality of image contrast is considered to be important parameter. The difference between luminance bounced back from two adjoining surfaces gives the value of contrast [8]. Contrast is defined as the difference in color and brightness of image with the same field of view or background.

1.1.3 Time Elapsed

Time elapsed is defined as the interval from the time taken to start the task till the task is completed. If we talk about time elapsed in image retrieval, it is the time required to retrieve the image from large database.

1.1.4 Histogram

The intensity of pixels of image represented in graphical format is known as histogram. It generally shows the maximum and minimum value of pixel of an image [4].

1.1.5 Local Range

In adjoining surface the pixel range value is small whereas in rough texture area the pixel range value is larger.

2. PROPOSED METHODOLOGY

Color and texture of an image from database has been primarily used to retrieve images from the retrieval system. In this paper adaptive texture descriptor method is used to calculate three parameters of image which are energy, contrast and time elapsed to retrieve image. The steps of methodology are as follows:

[1] To close all pre-open window.

[2] Load database in MATLAB workspace.

[3] To initialize input variation range, it should be negative or zero.

[4] Convert image from RGB to Gray.

[5] Find entropy, contrast and time elapsed for image.

[6] Combine the image features.

[7] Load test image.

[8] Apply procedure 3-6 to find combine feature of test image.

[9] To calculate elapsed time when features comparing with stored database.

[10] Display the result on GUI.

2.1 Objectives

[1] To extract features of image from the database.

[2] To calculate numerical value of parameters for comparative analysis such as contrast, energy, and time elapsed.

[3] To obtain the results in GUI as to make the output user friendly.

3. ANALYSIS OF RESULT

The developed algorithm is tested for various test images. Database consists of different color and texture-based image. The results obtained are shown in table.

3.1 Image Retrieval is Proposed with Adaptive Texture Descriptor Method

Value of texture of image from large database of images has been calculated. In this paper value of energy, contrast and elapsed time to retrieve the image is calculated. During the process of image retrieval, we require a query image and the features of this query image are being extracted and after that these features are matched with the features of image in database [5]. Firstly, the database is loaded in MATLAB and after that we resize the image from database to obtain the same size of images. Further we convert images from RGB to Gray format. Then we normalize the gray image for fixed mean and after this we find the histogram, local range, energy and time elapsed of each image [6].The closest values are displayed on GUI as result.

Table 1. Parameters of proposed algorithm

Test Images	Evaluation metrics	Previous Approach	Proposed Approach
Image 1	Energy	5.25616e-005	7.40186e-005
	Contrast	1828.91	2342.01
	Elapsed Time	30.6328	26.9958
Image 2	Energy	5.12588e-005	8.84614e
	Contrast	20.83.39	1900.36
	Elapsed Time	28.6623	25.4171
Image 3	Energy	6.56541e	9.94021e-005
	Contrast	1960.86	2283.6
	Elapsed Time	24.6873	23.513
Image 4	Energy	0.000101475	0.000122932
	Contrast	1463.19	1976.29
	Elapsed Time	26.0229	23.8763
Image 5	Energy	0.000101475	0.000122932
	Contrast	1463.19	1976.29
	Elapsed Time	28.34	21.2804

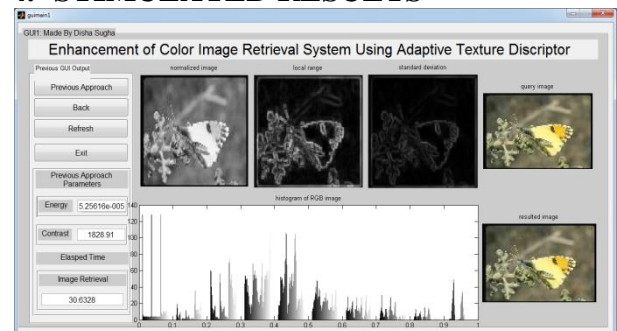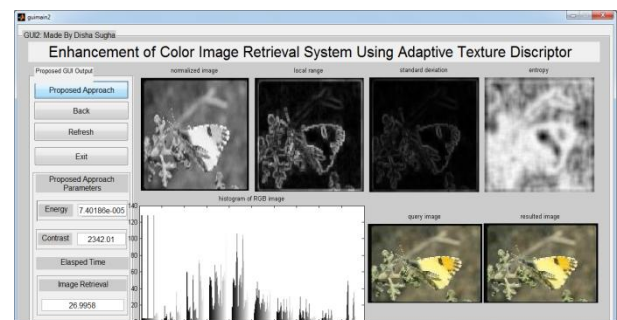## 4. STIMULATED RESULTS

Fig1. GUI1 previous approach

Fig2. GUI2 Proposed approach
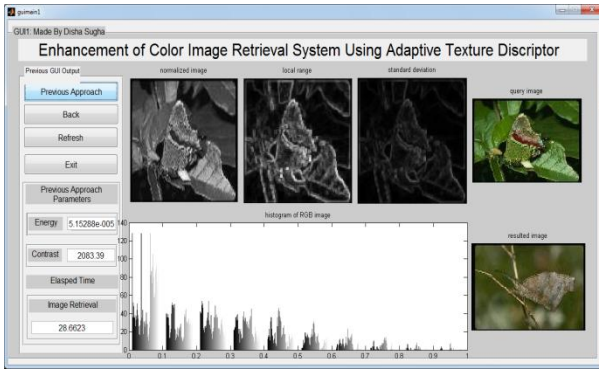
Fig3. GUI2 previous approach

Fig4. GUI 2 proposed approach

Fig5. GUI3 previous approach

Fig6. GUI3 proposed approach
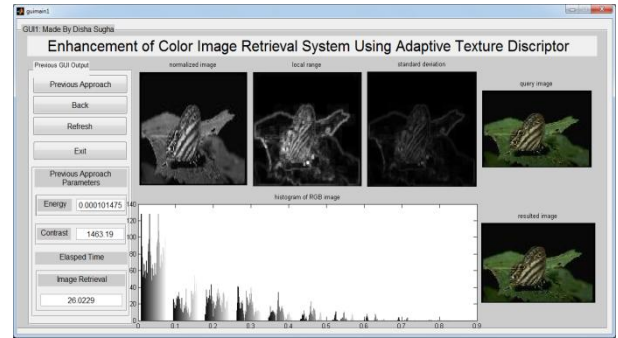
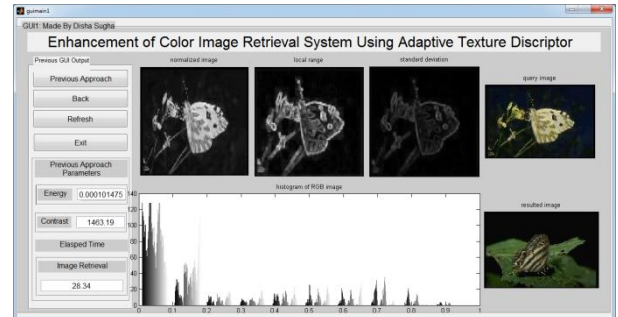
Fig7. GUI4 previous approach
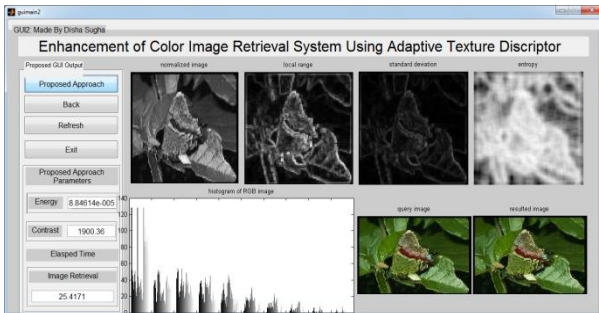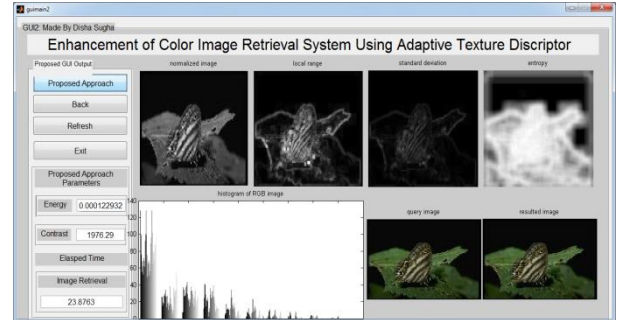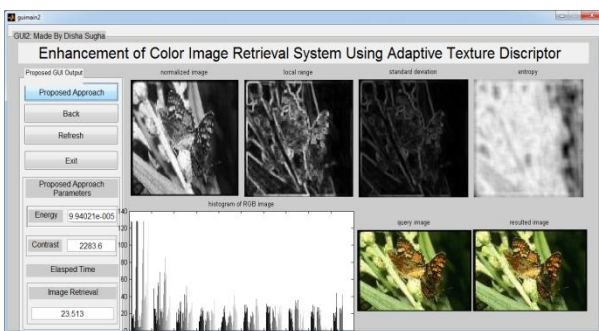

Fig8. GUI4 proposed approach
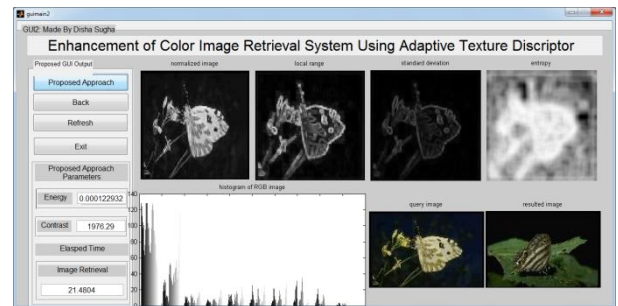

Fig9. GUI5 previous approach

Fig5.10- GUI5 proposed approach

5. CONCLUSION

On the basis of previous researches, this paper consists of calculation on three parameters, which are energy, contrast and time taken to retrieve the image. On the basis of these textures retrieved images from the database and give the retrieved time of images. It gives the best matchingimage from the database. For the future work using different type of features to enhance the pixel value of image and give the better image in result and can also improve the retrieved time of images [5].

6. REFERENCES

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