Color Image Techniques for Image Retrieval in Large Image Set of Database

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Abstract
In this paper we concentrated on content-based image retrieval system in early days many interactive systems performed with basic concepts but such systems are not reaching to the user specifications and not attracted to the user so a lot of research interest in recent years with new specifications, recent approaches have user friendly methods are expecting somany are concentrated for improvement. Assuming that a user is looking for a set of images with similar feature using the query concept within a huge database in this Proposed system we focus on the retrieval of images within a large image collection based on color projections and different mathematical approaches are applied for retrieval of image. before Appling proposed methods images are sub grouping using threshold values, in this paper R G B color combinations considered for retrieval of images and four proposed methodsare implemented and results are included ,through results it is observed that we obtaining fast and efficient results comparatively previous and existing methods . the aim this paper is to improve the efficiency to retrieve the query images .

Keywords
Color combination, threshold, Retrieval, Query, image Database

1. Introduction

The term content based image retrieval (CBIR)[1] is the application of computer vision techniques to the image related problems. Experiments into automatic retrieval of images from a large collection database, are based on the colors , shapes and texture and image features[2]. All techniques and algorithms that are used originate from fields such as statistics, pattern recognition[4][5] and computer vision.
Content-Based Image Retrieval (CBIR) is according to the user-supplied in the bottom characteristics, directly find out images containing specific content from the image library The basic process: First of all, do appropriate pre-processing of images like size and image transformation and noise reduction is taking place , and then extract image characteristics needed from the image according to the contents of images to keep in the database. When we retrieve to identify the image , extract the corresponding features[6][7] from a known image and then retrieve the image database to identify the images which are similar with it, also we can give some of the characteristics based on a query requirement , then retrieve out the required images based on the given suitable values. In the whole retrieval process, feature extraction is essential; it is closely related to all aspects of the feature , such as color, shape, texture and space.

1.1 Color Image :

A color image is a combination of some basic colors . In MATLAB breaks each individual pixel of a color image (termed 'true color') down into Red, Green and Blue values. we are going to get as a result, for the entire image is 3 matrices, each one representing color features . The three matrices are arranging in sequential order , next to each other creating a 3 dimensional m by n by 3 matrixes. an image which has a height of 5 pixels and width of 10 pixels the resulting in MATLAB would be a 5 by 10 by 3 matrixes for a true color image.

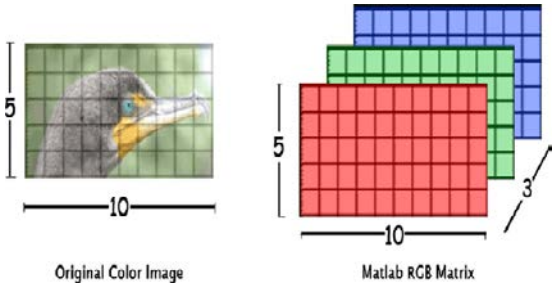

Fig: 1.1 Color image and RGB matrix

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1.2 Color Panel :

The following picture showing color panels projecting the color components in image is representing in following pictures 1.2 and 1.3 .

R=RGB(:,:,1); G=RGB(:,:,2); B=RGB(:,:,3);

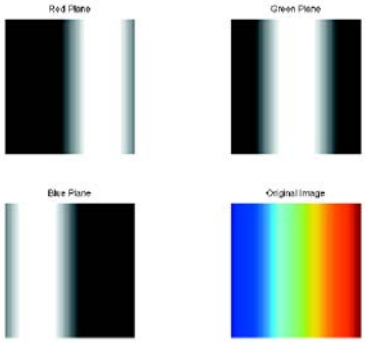


Fig :1.2 RGB Panel

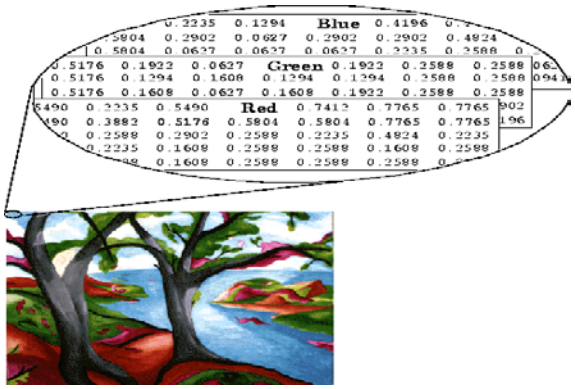


Fig :1.3 RGB projection example

1.3 Grayscale Image:

A grayscale[13] image is simply one in which the only colors are shades of gray. In fact a `gray' color is one in which the red, green and blue components all have equal intensity in RGB space, and so it is only necessary to specify a single intensity value for each pixel. Relation between RGB[14] and grayscale is presenting in the pic 1.3 in this color channel splitting of a full RGB color image. The column at left shows the isolated color channels in natural colors, while at right there are their grayscale equivalences:

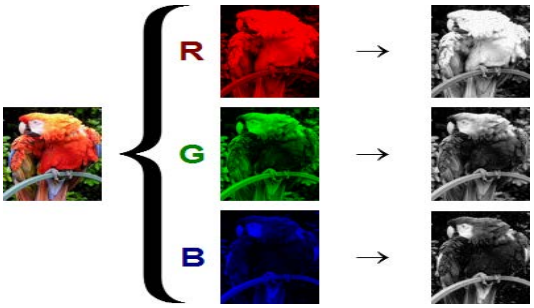


Fig : 1.3 RGB color s and related with grayscale

1.4 Applications of Image Retrieval Systems :

- Personal identification system
- Employee recruitments
- Photo gallery
- Diagnosis
- Crime prevention
- military instruments
- Architectural and engineering design
- GIS
- Forensic applications
- Number plate identification

2. Problem Description

In image retrieval system for searching ,browsing, and retrieving images from a large database of images[14]. Most conventional and common methods of image retrieval utilize some method of adding metadata such as tokens, captioning , keywords, or descriptions to the images so that retrieval can be performed over the annotation words. Some systems are working with lower level features , Manual image annotation is time-consuming, laborious and expensive. To address this, many researchers are proposed on automatic user friendly image retrievals using different methods .

Content-based means that the search will analyze the actual contents of the image. The term 'content' in this context might refer to colors, shapes, textures, or any other information that can be derived from the image itself. Without the ability to examine image content, searches must rely on metadata such as captions or keywords, which may be laborious or expensive to produce.

3. Proposed System

- Proposed system uses combinations of color feature to overcomes the problem description.
- Proposed system is implemented and concentrated on visual contents of an image such as color, shape, texture and spatial layouts.
- Proposed system selected 10000 image database with feature values .
- Proposed system extracted all images features separately R,G,B values for problem solving .
- Proposed system implemented features like color histogram ,color projections
- Mathematical approaches like mean and median are proposed for efficient retrieval
- Proposed work provides platform to extract images from the database using query method .

If the image is color image it is converting into gray color then calculated the sum of all bins in image histogram. Fig 3.1 is one example with threshold values with images .

ifisrgb(Image)

GImage=rgb2gray(Image);
p12=imhist(GImage); threshold=sum(sum(p12))

10880 12288

Fig 3.1

Using this method all images categorizing into N number Groups.

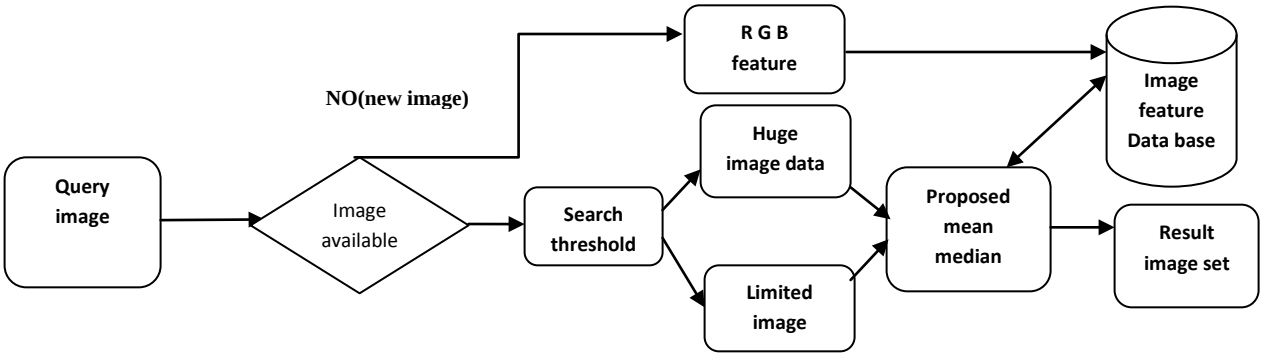


Figure 4.1:Image Retrieval System Architecture

4. Related Work :

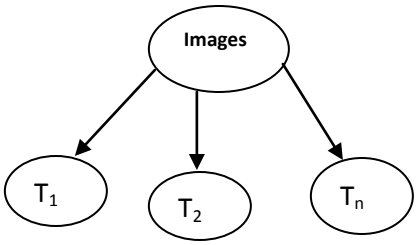
4.1 Image retrieval implemented in following steps :

Image retrieval is implemented in two phases one is new image insertion with features in to the database and other one is the new image searching in available database.

Step 1 :- All ten thousand images are taken in to working directory of MATLAB .

Step 2 :- Using MATLAB programming all images features calculated and stored into the database using specified programming methods.

Step 3:-Threshold calculation is taken for categorizing the images into the similar feature group s. in this step threshold value computed based on the histogram calculation.



Step 4:In usual methods image color values storing in the matrix form . using Image matrix all this R ,G, B components in image are extracted and separated into three different array forms (Red , Green , Blue)

Red(M ,J) =Image(M,J,1);
Green(M,J) =Image(M,J,2);
Blue(M ,J) =Image(M,J,3);

Step 5 : using the feature vectors each image color wise means are computed . in this method row and overall image mean is computed and stored into the

database .based on all this features deferent computing methods are formulated.

Mean_Row = sum(Row Values)/Number of Columns

Mean_color=sum(Mean_Row) / Number of Rows

```
mean_r=mean2(Red);
mean_g=mean2(Green);
mean_b=mean2(Blue);
```

```
median_r=median((median(Red))');
median_g=median((median(Green))');
median_b=median((median(Blue))');
```

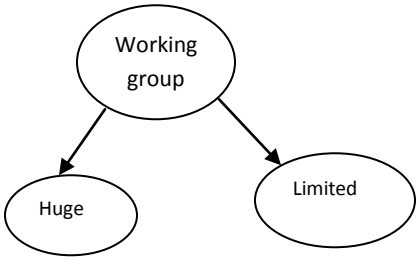
Step 6 :query image is selecting based on user choice and verifying threshold value if the threshold values is mapping the retrieval proposed methods are applying .

Step 6 : using the image feature vectors various retrieval methods are proposed, in Each method two different working group sets are identifying one is Huge image set group and second one is limited set of image group .

All Images = { T_1, T_2,T_3…… T_n }

Huge =$T_{equalent\ set}$ { T is threshold value and all images belongs to same T group }

Limit =$T_{equalent\ set\ with\ less\ images}$



4.2 Proposed Methods (PM) :-

in each method two image feature values are verifying from available database files, after that comparing equalities of query image(QI) and target image(TI). TI are may be similar or equal or not equal so based on the difference factor(DF) images are identifying .

DF= Constant {this value is proposed by user }

PM 1 :- selecting the only one color mean value from image vector database means are comparing in the range of DF .

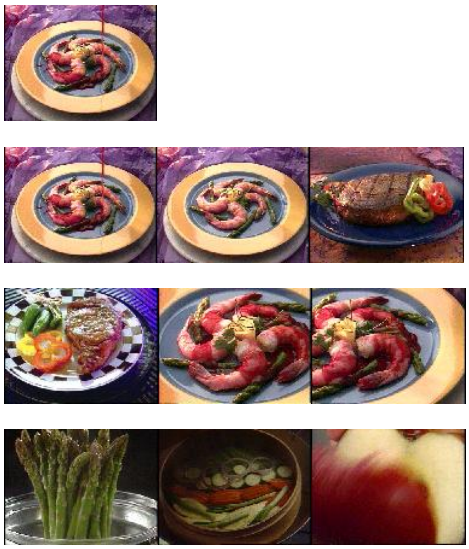
PM 2 :- selecting the two colors mean values from the image feature database if the means are equal or similar values with in the range of DF .

Two color mean are like RG,RB,GB .

PM 3 :- selecting the three color mean values from the image feature database if the means are equal or similar values with in the range of DF .

PM 4 :- selecting the three color median values from the image feature database if the medians are equal or similar values with in the range of DF

Query image:



In this example one dish with plate is taken as a query image after that according to the method sequence image features are verified for this query red_mean value is taken 20 different factor is taken in the image set 66.6% successes rate is founded .

5. Experimental Results :

Using mean values query is applied

p.name	R_mean	Picture
998.jpg	63.36859	

997.jpg 65.08289

995.jpg 75.65936

993.jpg 82.29895

992.jpg 83.37225

991.jpg 84.91315

996.jpg 86.83167

994.jpg 110.7877

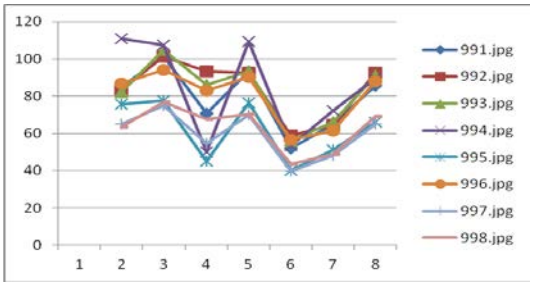
In above table it is showing that if the image is searching based on red_mean type top 8 pictures are displaying in table order .in above example DF value is 25 from pic 995.jpg. to remaining pictures .

PIC	Threshold	R_MEAN	G	B	RG_AVG	RB	GB	RGB
991.jpg	10880	84.91315	101.3946	70.87982	93.15388	51.93099	64.84949	85.72919
992.jpg	10880	83.37225	101.3106	93.328	92.34143	58.90008	64.55068	92.67028
993.jpg	10880	82.29895	104.5754	85.91925	93.43718	56.07273	66.00419	90.9312
994.jpg	10880	110.7877	107.5833	50.07007	109.1855	53.61926	72.25627	89.48036
995.jpg	10880	75.65936	77.5484	45.00427	76.60388	40.22121	51.38409	66.07068
996.jpg	10880	86.83167	93.98053	82.88165	90.4061	56.57111	61.46221	87.89795
997.jpg	10880	65.08289	74.93854	54.64471	70.01072	39.9092	48.31642	64.88871
998.jpg	10880	63.36859	76.91479	67.53912	70.14169	43.6359	49.01883	69.27417

PIC	TRISHOLD	R_MEAN	G	B	RG_AVG	RB	GB	RGB
991.jpg	10880	6	6	5	6	4	6	4
992.jpg	10880	5	5	7	5	8	5	8
993.jpg	10880	4	7	8	7	6	7	7
994.jpg	10880	8	8	2	1	5	8	6
995.jpg	10880	3	3	1	3	2	3	2
996.jpg	10880	7	4	6	4	7	4	5
997.jpg	10880	2	1	3	1	1	1	1
998.jpg	10880	1	2	4	2	3	2	3

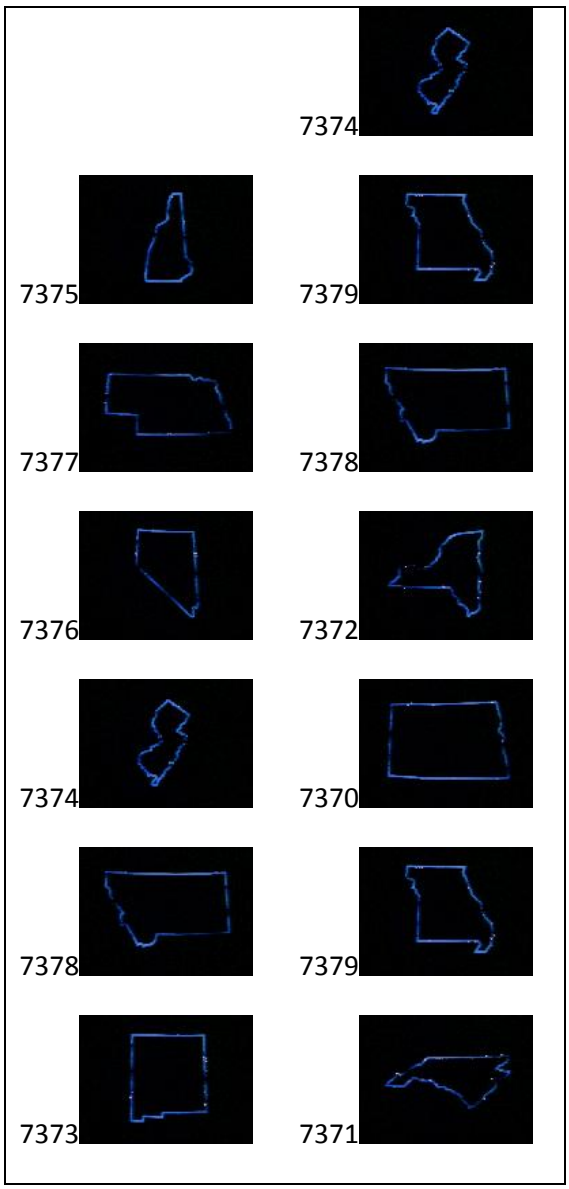
The above tables are showing that picture names and color means of R,G,B ,two color combination averages and final RGB is calculated values represented 8 images .in above second table all rules one by one applied a any rule from the proposal .

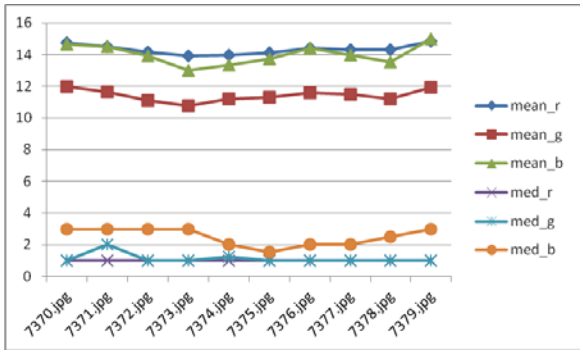
In the above tables based on the color mean combination methods results are showing that almost 75 to 90 % of picture is looking similar .At the same time we can notify that the results for single color to combination of colors features if combining similar images are coming together .this we can observe through ranking(1 to 8) , in this observation we can conclude that instead of using single color projection we can select different combinations of color methods applying we can achieve good performance.



In above graph images relations in various methods is indicated .(2 is r_mean,3 is g_mean,4 is b_mean,5 is rg_avg, 6is rb_avg,7is gb_avg,8 is rgb_avg means.

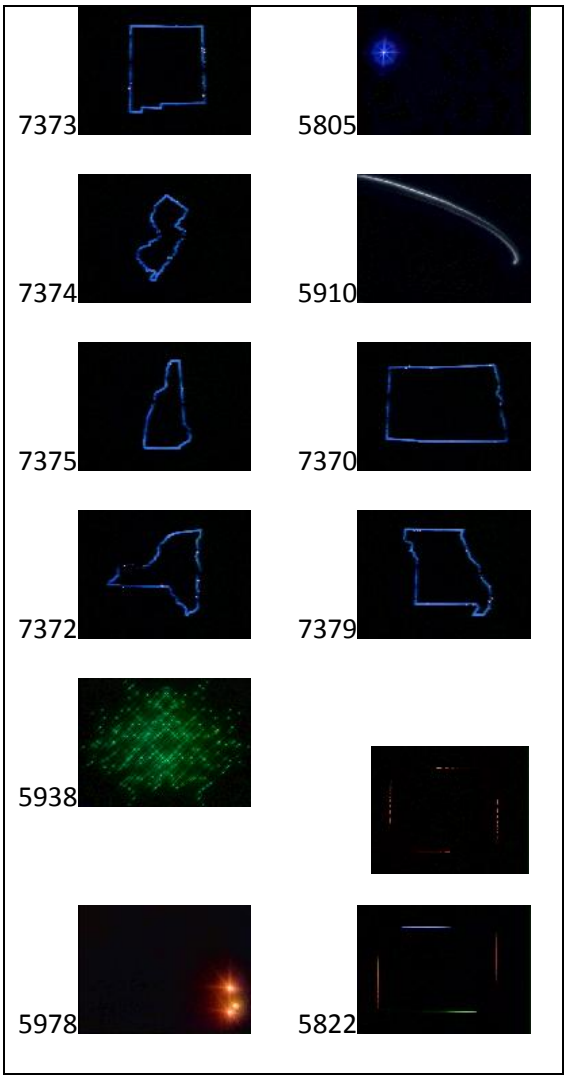
5.1 Median red applied in selected set of images in that following order is performed :-

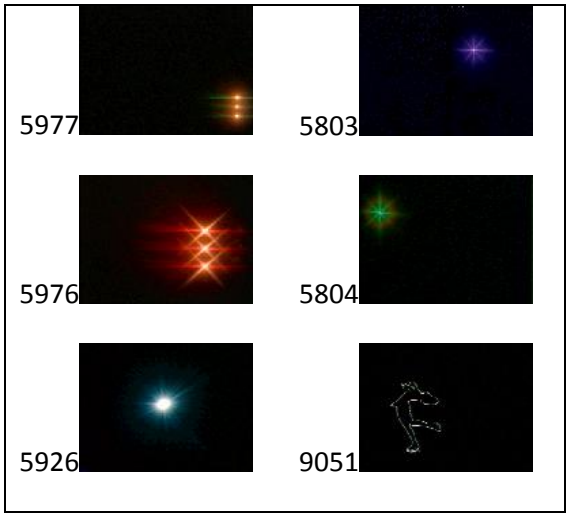




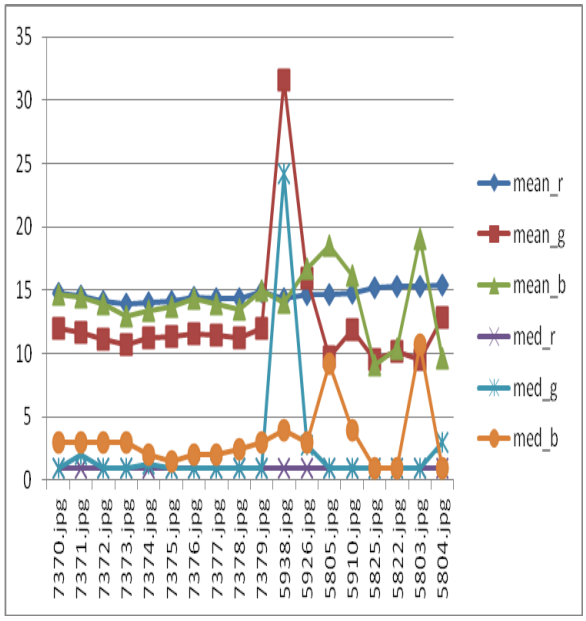
In above graph all pictures mean and median values are presenting .

Selection of Huge database using median method :-





Huge database is considered for retrieval of images .through graph mean and medians variations we can see .at the same time pictures similarity also changing so using proposal methods useful to find pictures similarities with efficient way**.**



5.3 FUTURE ENHANCEMENT

most Internet-based Content-Based Image Retrieval (CBIR) systems focus on different stock photo collections and do not address challenges of large specialized image collections and topics such as semantic information retrieval by image content.in my research work I concentrated more than 10000 images with different categories of images .this work is helping towards large set of image retrieval applications .

6. CONCLUSION

This method is efficient[13] comparatively old methods which is used to retrieve the images from the huge database .in this work we compared total 10000 images with different categories. all suggested methods are helpful to perform the good results and based on query images what are the images retrieved all images showing vary similar and varying method to method so best one is to select the combinations of colors mean with median selections methods it gives us best performs and good results. Current techniques are based on low level features and there is a huge semantic gap existing. in future days more research work is needed with user interest with a reliable and semantically competent system.

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