A Critical Review of Image Retrieval Methods Using Color and Texture Features

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ABSTRACT

Due to the reimbursed improvement of web innovation, picture reports have turned into a significant data source. It is difficult to recover certain pictures from every single accessible one. An intuitive picture proposal framework, which initially uses shading histogram highlight and GCLM surface component to express picture substance, at that point a bit based K-implies is used to group pictures into various classes by their visual highlights, at last dependent on an element vectors put away in the database the comparative pictures are recovered. The HSV shading histogram is determined and the joint histogram is inferred dependent on the mix of the tone and immersion in the tint and immersion histogram. The shading highlight is removed from the joint histogram. The chi-square is utilized to discover the likeness between the two pictures. Along these lines worldwide component is determined utilizing the joint histogram. The provincial component is extricated utilizing the GCLM method where the neighbor pixels is considered into record. The assessment results exhibit the exactness of the recovery dependent on the accuracy and review false positive and negative proportion. The ROC bend is utilized to think about the productivity of the shading, surface and the mix of both the shading and the surface.

KEYWORDS: Image Recommendation, similarity-preserving Image retrieval, CBIR

1. INTRODUCTION

A key part of the Content Based Image Retrieval framework is highlight extraction. An element is a trademark that can catch a specific visual property of a picture either internationally for the entire picture, or locally for articles or districts. Some key issues identified with CBIR frameworks are the accompanying. To begin with, how the separated highlights can present picture substance. Second, how to decide the likeness between pictures dependent on their extricated highlights. One procedure for these issues is utilizing a vector model. This model speaks to a picture as a vector of highlights and the contrast between two pictures is estimated by means of the separation between their component vectors.

There exist two ways to deal with pursuit, to peruse, and to recover pictures. The first depends on printed data ascribed to the pictures physically by a human. This is called idea based or message based picture ordering. A human depicts the pictures as per the picture content, the subtitle, or the foundation data. Notwithstanding, the portrayal of a picture with content requires critical exertion and can be costly, repetitive, tedious, abstract, deficient, and conflicting. To beat the impediments of the content based methodology, the subsequent methodology, Content-Based Image Retrieval (CBIR) strategies are utilized. In a CBIR framework, pictures are consequently listed by abridging their visual highlights, for example, shading, surface, and shape. These highlights are consequently separated from the pictures.

In this paper, we present an intuitive comparative picture recovery framework and assess which shading or surface highlights are the most productive to speak to similitude of shading pictures. Our underlying outcomes demonstrate that the shading histogram descriptors are not powerful highlights since they don't think about spatial data of picture pixels. In this manner, various pictures may have comparable shading circulations. What's more, our outcomes demonstrate that the co-event network highlights recover considerably more significant pictures than other shading and surface highlights. Moreover, so as to expand accuracy, the blend of shading and surface highlights ought to be utilized in CBIR frameworks. Qirong Bo,Jinye Peng[1] indicates the Image Recommendation System by extricating the shading or surface component dependent on the picture. Yuli Gao, Jianping Fan et al [2] clarifies that picture web crawlers, for example, Google and Yahoo, have worked

admirably in which after clients input a couple of catchphrases, picture web search tools can show the pictures identified with the watchwords. Jianping Fan et al [3] clarifies that a theme system is naturally produced to outline enormous scale accumulations of physically commented on. Yuli Gao et al [4] clarifies the method for sifting through Junk pictures from the Google search picture. In substance based picture recovery framework the shading and surface component is separated and bunching is done so as to gather the comparable element vector and the example pictures are removed from the each gathering of the picture. The usefulness of substance based picture recovery is appeared in the beneath Fig: 1.1 Block Diagram.

Block diagram

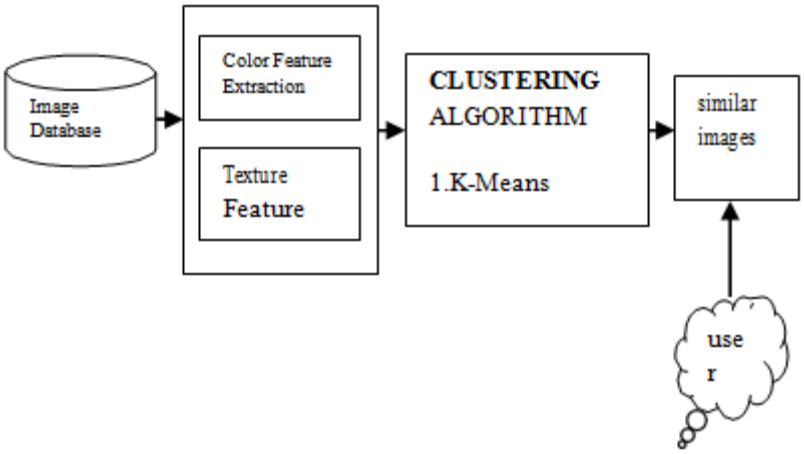


Figure 1.1 Block Diagram

N (h_i, s_j) is the total number of pixel in both the of bits in each pixel in an image. For example, if we suppose a pixel depth of n bit, the pixel values will be between 0 and 2^n-1, and the histogram will have 2^n elements. The HSV space color histogram is calculated and the joint histogram is calculated by using Hue and Saturation Histogram by calculating the total number of pixel in both the Hue and Saturation Histogram.

The joint histogram is calculated using
p (h_i, s_j)=N(h_i, s_j)/ N_{total}
The remainder of the paper is sorted out in the accompanying ways. In Section II shading and surface element is sketched out. In Section III the point by point highlight extraction is delineated. In Section IV plot about the bunching and Section V is finishing up with the outcomes and end.

2. COLOR AND TEXTURE FEATURE

In Content Based Image Retrieval [5] the element extraction assumes the real job. The shading and surface element are extricated for the picture. These removed highlights are utilized to locate the comparable pictures. This segment examine about the capacity that are utilized to separate the component and the element that are removed.

Color Feature

Shading is a significant component for picture portrayal which is generally utilized in picture recovery. This is because of the way that shading is invariance as for picture scaling, interpretation, and pivot. The key things in shading highlight extraction comprise of shading space, shading quantization, and the sort of likeness estimations. Shading Feature can be extricated utilizing shading minute, shading histogram, and Color Coherence Vector (CCV) are utilized.

Shading Histogram is generally founded on the power of three channels. It speak to speaks to the quantity of pixels that have hues in every one of a fixed rundown of shading ranges. Shading Moment is based used to defeat quantization impact in shading histogram. It speaks to ascertain the shading similitude by weighted

Euclidean separation. Shading set is utilized for quick hunt over enormous gathering of picture. It depends on the determination of shading from quantized shading space.

A histogram is the appropriation of the quantity of pixels for a picture. The shading histogram speaks to the shading substance of a picture. It is vigorous to interpretation and revolution. Shading histogram is a worldwide property of a picture. The quantity of components in a histogram relies upon the number tone and immersion histogram, N total is the all out number of pixel in the picture. The joint histogram can be utilized to proficiently ascertain the mean, standard deviation, entropy, skewness and kurtosis of enormous informational indexes. This is particularly significant for pictures, which can contain a large number of pixels. The whole of all components in the histogram must be equivalent to the quantity of pixels in the picture.

For assessment some example pictures so as to assess diverse removed highlights. In assessment, a recovered picture is viewed as a match if and just on the off chance that it is in a similar classification as the inquiry picture. Also, the adequacy of the separated highlights has been estimated by accuracy and review parameters.

Exactness is the proportion of significant recovered pictures to the all out number of recovered pictures. Review is the proportion of recovered pertinent pictures to the complete number of significant pictures in the database.

Texture Feature

Surface [6] alludes to visual examples with properties of homogeneity that don't result from the nearness of just a solitary shading, for example, mists and water. Surface highlights regularly comprise of difference, consistency, coarseness, and thickness. There are two fundamental classes of surface descriptors, in particular, measurable model-based and change based. The previous one investigates the dim dimension spatial reliance of surfaces and after that concentrates some factual highlights as surface portrayal. One case of this gathering is co-event network portrayal. The last methodology depends on some change, for example, DWT.

2D Discrete Wavelet Transform is the wavelet portrayal of a discrete sign X comprising of N tests can be processed by convolving X with the low pass and high pass channels and down inspecting the yield signal by 2, so the two recurrence groups each contains N=2 tests. With the right selection of channels, this activity is reversible. This procedure deteriorates the first picture into two sub-groups: the lower and the higher band. This change can be reached out to numerous measurements by utilizing detachable channels. A 2D DWT can be performed by first playing out a 1D DWT on each line (level separating) of the picture pursued by a 1D DWT on every section (vertical sifting). The primary disintegration level (d = 1). In this dimension the first picture is deteriorated into four sub-groups that convey the recurrence data in both the flat and vertical bearings. So as to shape numerous disintegration levels, the calculation is connected recursively to the LL sub band. The second (d = 2) and third (d = 3) deterioration levels just as the format of the various groups. The 2D DWT has been connected multiple times on all pictures. As such, third decay level has been figured. In that dimension, there are 10 sub groups. The mean and standard deviation of each sub band has been figured as surface highlights. This implies each picture has 60 surface highlights, which have been acquired utilizing wavelet co-productive.

Dim dimension co-event approach uses Gray-Level Co-event Matrices (GLCM) whose components are thegeneral frequencies of event of dark dimension mixes among sets of picture pixels. The GLCM can consider the relationship of picture pixels in various ways, for example, level, vertical, corner to corner, and antidiagonal. The co-event framework incorporates second-request dark dimension data, which is for the most part identified with human recognition and the separation of surfaces . Four factual highlights of the GLCMs are processed. The highlights are vitality, entropy, differentiation, and homogeneity. G *G GLCM Pd for a dislodging vector d = (dx; dy) is characterized as pursues. The (I; j) of Pd is the quantity of events of the pair of dark dimension I and j which are a removed separated.

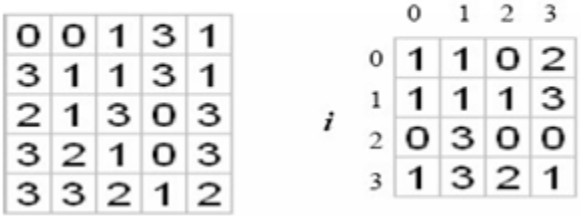


Figure 2.1 depicts the Co-Occurrence Matrix Functionality of the dark dimension co-event network in detail.

Direction of the picture can be determined utilizing the Gabor surface in which the direction and the recurrence are taken into contemplations.

A lot of 113 pictures is considered for removing the element. The pictures are JPEG pictures with standard goals of 640x480. The pictures and highlight are put away in MySQL database. The highlights are separated utilizing the MATLAB.

3. K-MEANS CLUSTERING

K-implies is one of the easiest unsupervised learning calculations that take care of the outstanding bunching issue. The method pursues a straightforward and simple approach to order a given informational collection through a specific number of bunches (expect k groups) fixed from the earlier. The principle thought is to characterize k centroids, one for each bunch. These centroids ought to be put in a shrewdness route on account of various area causes diverse outcome. In this way, the better decision is to put them however much as could be expected far from one another. The following stage is to take each guide having a place toward a given informational index and partner it to the closest centroid. At the point when no point is pending, the initial step is finished and an early gathering age is finished. Now we have to re-figure k new centroids as bar focuses of the

groups coming about because of the past advance. After we have these k new centroids, another coupling must be done between similar informational index focuses and the closest new centroid. A circle has been created. Because of this circle we may see that the k centroids change their area well ordered until no more changes are finished. At the end of the day centroids don't move any more. In Fig 3.1 the K-Means Clustering is portrayed in itemized. Image

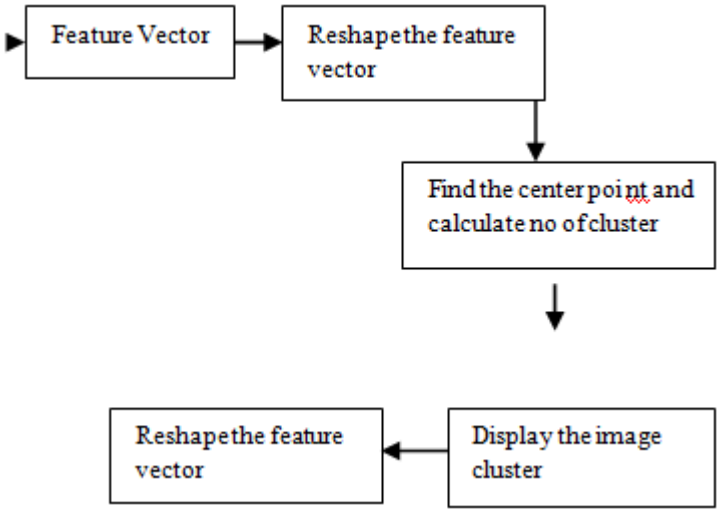


Fig 3.1

Architecture of K-Means Clustering

Thus the co-occurrence matrix is used to find the pixel level similarity in the image. So, the extracted feature is based on the neighbor pixel value. The different angle images are not retrieved using the GCLM technique.

4. RESULTS AND CONCLUSION

The pictures and their component are put away in the MySQL database. The element of the picture is grouped utilizing the K-Means Clustering calculation. The picture, number of group to be framed and the strategy for picking the midpoint is given as the info work.

Figure 3.1 Original Image

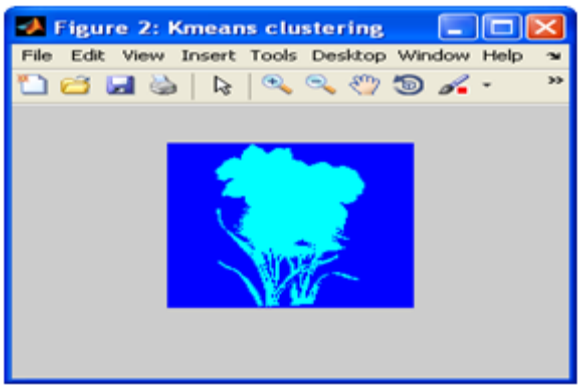


Figure 3.2 Image where K (no of cluster) =2

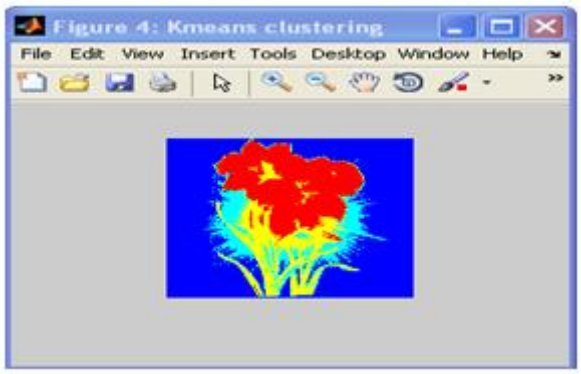


Figure 3.3 Image where K (no of cluster) =4

At the point when the client give the question picture the shading and the surface element is separated and contrasted and the element of the pictures in the database. The six shading highlight is contrasted and the six shading highlight in the shading table. The four surface element is contrasted and the four surface element in the surface table. Both shading and surface component are contrasted and the shading and surface element in the database. As appeared over the shading and surface component are removed and put

away in the database the element of the question pictures is likewise extricated and the element of the inquiry is contrasted and the database picture.

Fig 4.1 and Fig 4.2 gives the detail of the component extraction. In the figure the shading highlight for picture 5 and 6 are same however it shifts in the surface so the both shading and surface are significant while recovering the comparable pictures.

Table 4.1 Color Feature Table

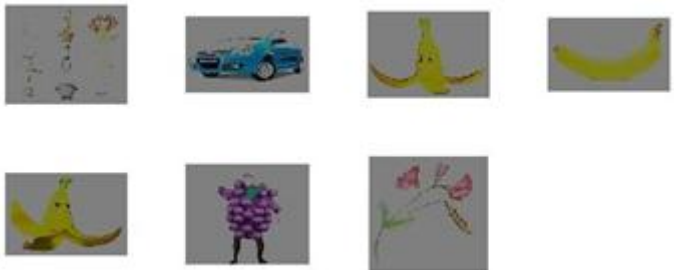
Image	**Color Feature**					
	mean	**Varia-nce**	**Entr-opy**	**Std deviation**	**Skew-ness**	**Kurt-osis**
1	1.875	33.45	0.696	5.783	3.336	12.673
2	1.8125	27.22	0.544	5.218	2.686	8.8154
3	1.75	33.133	0.696	5.7562	3.4430	13.218
4	1.75	49.0	0.337	7.0	3.6148	14.067
5	0.125	0.25	0.337	0.5	3.6148	14.067
6	0.125	0.25	0.337	0.5	3.6147	14.066

Table 4.2 Texture Feature Table within the threshold value is retrieved from the color, texture and color texture table as show below

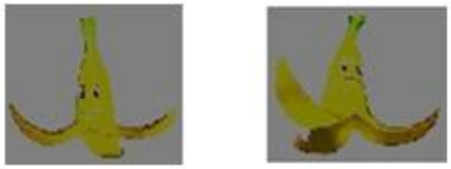
Image	Texture Feature			
	contrast	correlation	energy	homogeneity
1	0.1988	0.95973	0.1578	0.91623
2	0.1608	0.93966	0.2190	0.92869
3	0.2417	0.91877	0.1840	0.89827
4	0.3439	0.72931	0.3370	0.90028
5	0.21452	0.9608	0.1446	0.90348
6	0.14135	0.9642	0.1617	14.0666

Query image

In color feature database the output is



As show below the query image feature is extracted and compared with the feature table and the images which is In Both Color and texture Database



For assessment some example pictures so as to assess distinctive extricated highlights. In the assessment, a recovered picture is thought about a match if and just on the off chance that it is in a similar class as the question picture. Furthermore, the viability of the removed highlights has been estimated by exactness and review

parameters. Exactness is the proportion of significant recovered pictures to the absolute number of recovered pictures. Review is the proportion of recovered important pictures to the all out number of pertinent pictures in the database.

In Texture Database the output is

Table 4.3 Evaluation of color and texture feature

S #	Color Feature		Texture Feature		Color & Texture Feature	
	Precision	ecall	Precision	Recall	Precision	Rec all
1	0.2	0.333	0.4	0.2	0.2	0.3 33
2	0.2857	0.4	0.5	0.333	0.5	0.5
3	0.25	0.5	0.666	0.5	0.666	0.6 66
4	1	0.333	1	0.875	1	0.3 33

The yellow banana picture was chosen as an inquiry picture. Shading histogram highlights can recover 7 pictures 3 of which are banana pictures, while the other 4 are most certainly not. In this manner, its exactness and review are 3/7 = 0.4286 and 3/6 = 0.5, separately. Surface highlights can recover 5 pictures 2 of which are banana pictures, while the other 3 are definitely not. Along these lines, its accuracy and review are 2/5=0.4 and 2/6=0.3333, individually. Both the mix of shading and surface picture can recover 2 pictures where both 2 pictures are banana pictures. In this manner, its accuracy and review are 2/2=1 and 2/6=0.3333, individually. Table 5.1, 5.2, 5.3 depicts different estimations of the shading, surface and both shading surface database. In this manner ROC bend is drawn for the arrangement of 5 estimation of accuracy and review for shading, surface and both shading and surface component is appeared.

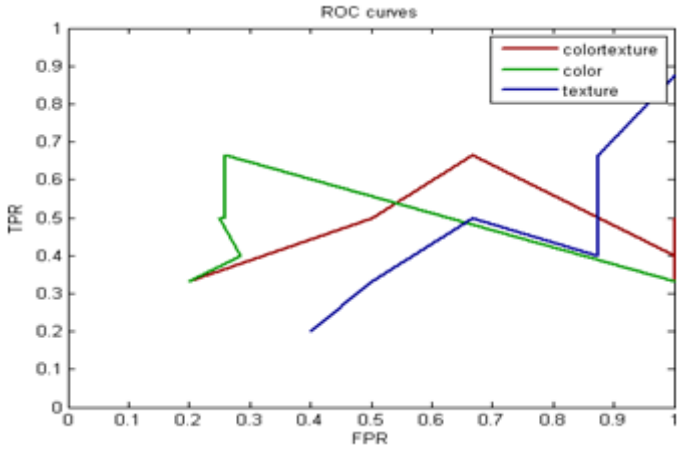


Figure 4.1 ROC curve

The ROC curve is used to visualize which feature has more information. From the graph it is clear that the combination of both color and texture curve has more accuracy when compared with the only color feature or only the texture feature. In both the color and the texture the accuracy varies frequently compared to that of combing both the color and the texture feature.

5. CONCLUSION

In this paper, the color feature is extracted from the joint histogram and the texture feature is extracted using the GCLM feature. The k-means clustering is used to cluster the feature of the image. The ROC curve is drawn in order to evaluate the performance of the feature extraction. ROC curve is drawn in order to evaluate the performance of the feature extraction. The ROC curve is drawn for False Positive Ratio and True Positive Ratio. The ROC curve demonstrates that color feature does not give the uniform curve for every query image as the moves up and down. The color feature curve is shown in green color. The texture curve is also not stable as the false positive and true negative is varying for various query images. The color texture feature gives the increasing curve for the query image.

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