Retrieval Techniques for Feature Extraction In Cbir System

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ABSTRACT

In order to find an image, image has to be represented with certain features. Color, texture and shape are three important visual features of an image. I will implement an efficient image retrieval technique which uses dynamic dominant color, texture and shape features of an image. As a first step, an image is uniformly divided into 8 coarse partitions. The centroid of each partition is selected as its dominant color after the above coarse partition. By using Gray Level Co-occurrence Matrix (GLCM), texture of an image is obtained. Color and texture features are normalized. Using Gradient Vector Flow fields, shape information is captured in terms of edge images computed. To record the shape features, invariant moments are then used. A robust feature set for image retrieval is provided by using the combination of the color and texture features of an image in conjunction with the shape features. In retrieving the similar images, weighted Euclidean distance of color, texture and shape features is used.

Keywords: MATLAB, Data Source: Bunch of Images

1. INTRODUCTION

Content-based image retrieval (CBIR) has become a prominent research topic. Therefore an important problem that needs to be addressed is fast retrieval of images from large databases. To find images that are perceptually similar to a query image, image retrieval systems attempt to search through a database. CBIR can greatly enhance the accuracy of the information being returned and is an important alternative and complement to traditional text-based image searching. For describing image content, color, texture and shape features have been used. Color is one of the most widely used low-level visual features and is invariant to image size and orientation.There are color histogram, color correlogram, and dominant color descriptor (DCD) as conventional color. The CBIR Text Based means of given image annotation which provide the information given for the images .Text Based Image retrieval techniques based on

textual annotation of images and these are based on two steps, firstly the images were annotated with text, and secondly the images are searched based on their textual tag or keywords action which used by the users for searching such images.

2.RESEARCH METHODOLOGY

2.1 HSV Color Model

The HSV stands for the Hue, Saturation and Value. The coordinate system is a hexacone in Figure 2.1 (i). And Figure 2.1 (ii) a view of the HSV color model. The Value represents intensity of a Color, which is decoupled from the color information in the represented image. The hue and saturation components are intimately related to the way human eye perceives color resulting in image processing algorithms with physiological basis.As hue varies from 0 to 1.0, the corresponding colors vary from red, through yellow, green, cyan, blue, and magenta, back to red, so that there are actually red values both at 0 and 1.0. As saturation varies from 0 to 1.0, the corresponding colors (hues) vary from unsaturated (shades of gray) to fully saturated (no white component). As value, or brightness, varies from 0 to 1.0, the corresponding colors become increasingly brighter.

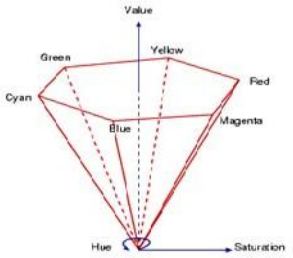
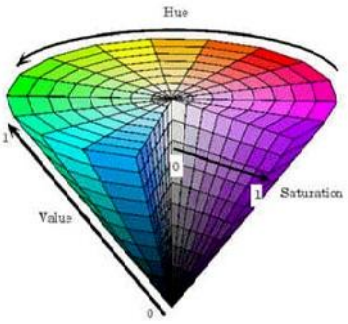
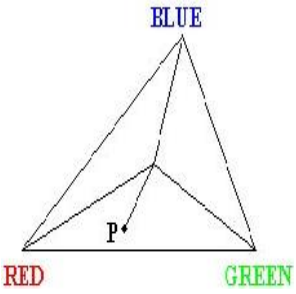


Fig. 2.1 (i): HSV Coordinates System



Fig, 2.1 (ii):HSC Color Model

2.2. RGB to HSV Conversion



In Figure 2.2 (i) the obtainable HSV colors lie within a triangle whose vertices are defined by the three primary colors in RGB space The hue of the point **P** is the measured angle between the line connecting **P** to the triangle center and line connecting RED point to the triangle center.

figure 2.2(i)

3. DESIGN FLOW

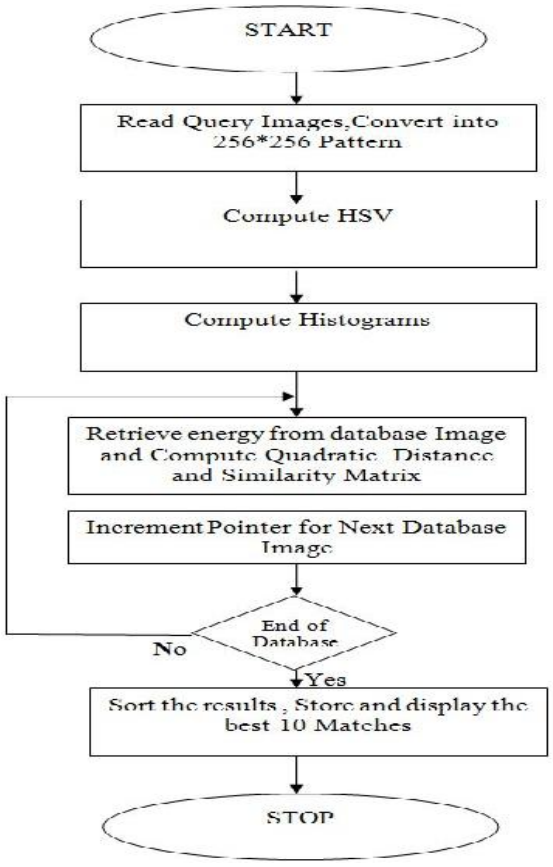


Fig. 3.1Color Feature Extraction and Retrieval

4. HSV TO RGB CONVERSION

Conversion from HSV space to RGB space is more complex and given to the nature of the hue information, we will have a different formula for each sector of the color triangle.

Red-Green Sector:

For $0° < H \leq 120°$

$$b = \frac{1}{3}(1-S),\ r = \frac{1}{3}\left[1+\frac{SCosH}{Cos(60°-H)}\right],\ g = 1-(r+b)$$

Green-Blue Sector:

For $120° < H \leq 240°$

$$r = \frac{1}{3}(1-S),\ g = \frac{1}{3}\left[1+\frac{SCosH}{Cos(60°-H)}\right],\ b = 1-(r+b)$$

Blue-Red Sector:

For $240° < H \leq 360°$

$$g = \frac{1}{3}(1-S),\ b = \frac{1}{3}\left[1+\frac{SCosH}{Cos(60°-H)}\right],\ r = 1-(r+b)$$

5. RESULTS & ANALYSIS

Thus in this phase we took a literature survey for various CBIR methods. The semantic gap between low level features and high level concept more and the retrieved output consisted lot of errors. Hence we wish to propose a new

algorithm that retrieves the images based on color, texture and fuzzy features. Then integrated results will be outputted to the user. Hence the retrieval accuracy will be high and less interaction is needed. In this phase we propose two different algorithms, colour and texture base. then the ranked images are retrieved. The computed distance is ranked according to closest similar; in addition, if the distance is less than a certain threshold set, the corresponding original images is close or match the query image. Precision P is defined as the ratio of the number of retrieved relevant images r to the total number of retrieved images n, i.e.P =r/n [1]. Precision measures the accuracy of the retrieval.

Precision =

$$\frac{No.of\ relevant\ \text{Images retrieved}}{Total\ no.of\ images\ retrieved} = \frac{r}{n}$$

Recall is defined by R and is defined as the ratio of the number of retrieved relevant images r to the total number m of relevant images in the whole database, i.e. R=r/m [1]. Recall measures the robustness of the retrieval.

Recall =

$$\frac{No.of\ relevant\ \text{Images retrieved}}{Total\ no.of\ relevant\ images\ retrieved} = \frac{r}{n}$$

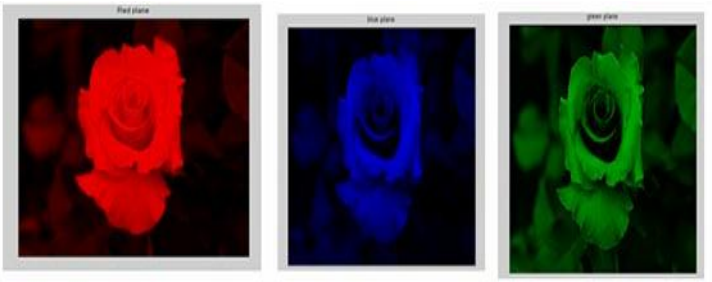
6. DATABASE IMAGES

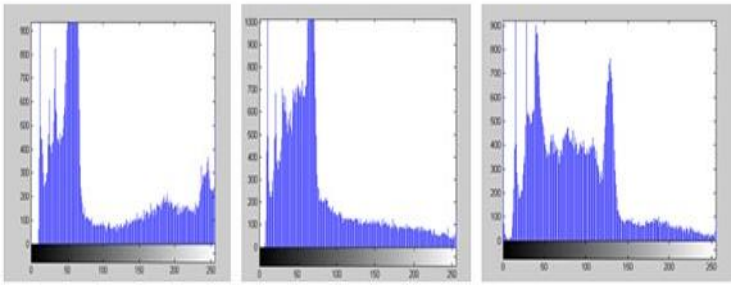
X Ray

Rose

The example of rose find RGB Color Plane separation for Color Based Image Retrieval.

The below images rose shown RGB plane separation and its corresponding Histograms.





The Average Recall Rate (AVRR) is given by the equation

$$AVRR = \frac{1}{Q}\left\{\sum_{j-1}^{Q} \frac{\sum_{i-1}^{10} Rank_i}{N_r}\right.$$

where the rank of any of the retrieved images is defined to be its position in the list of retrieved image is one of the relevant images in the database. The rank is defined to be zero otherwise. Nr is the number of relevant images in the database, and Q is the number of queries performed. Therefore AVRR is defined in equation .In our case, the number of images retrieved was 10, and Nr was less than 10.AVRR = $(N_r + 1) / 2$

CONCLUSION

In order to use a good color space for a specific application, color conversion is needed between color spaces. The good color space for image retrieval system should preserve the perceived color differences. In other wordsIt has been found that variation in feature extraction methodologies can ensure the better and more accurate retrieval of relevant images from the large image database.

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