

Retrieval of Image by Combining the Histogram and HSV Features Along with Surf Algorithm

Neha Sharma^{#1}

[#]Student M.tech in Instrumentation and Control Engg.(Final year) Electrical Department Punjab Technical University
Baba Banda Singh Bahadur Engineering College Fatehgarh Sahib, Punjab India

Abstract— Content Based Image Retrieval (CBIR) In this paper Surf features along with the content properties of an image are used. Input will be one image file and software will search for the same images in database folder based on content properties (i.e. shape, color or texture) encoded into feature vectors. Before storing the image in the database the key features from image are extracted.

Keywords— Content-based image retrieval, Image database, Image descriptors, Surf features.

I. INTRODUCTION

The traditional approach to retrieve images is time consuming and won't be helpful in case of huge databases so to manage and store ample amount of data Content-Based Image Retrieval (CBIR) systems are now have been developed.[4] In these systems, image processing algorithms (usually automatic) are used to extract feature vectors that represent image properties such as color, texture, and shape. [3]

II. RELATED WORK

There are loads of paper which are using CBIR technique for the image retrieval they have used this technique for image detection in various fields e.g. parking space for cars, detection of patients in medical firms, face recognition for use in biometric applications, robotic guidance to traverse a terrain without striking any obstacles and taking the simplest route, and character recognition in textual data. [9]

The techniques which are used to retrieve image from database includes various techniques e.g. for creation of database My Sql is used which will store images in it's database further with the use of Dot Net or C++ programming languages code would be developed. These code file would be called in matlab which would become the mex files; the C++ library would be first called in the matlab software before calling the C++ functions. Hence the retrieved image will be displayed.

A. Techniques used

The techniques used earlier were time consuming and were less efficient. The main benefit of CBIR approach is the automatic and quick retrieval process of images rather than the conventional keyword-based approach which require much effort and is time consuming as it uses annotations (clue or explanation) of database images.[3] The traditional approach would seek for basics things for the search of image in the database i.e. the textual data which includes all the information i.e. creation of file, author of the file, date of creation, need of creations and much more. This all information would lead to more confusion if the amount of data stored is huge. The othher technique which is more beneficial and less consuming is the serching the the on basis of content i.e.(shape, color, texture) .

The technique which would be used in this paper is extraction of the histogram from imag with the HSV (Hue Saturation and Value) features and further compairing it with the SURF algorithm. SURF means speeded up robest feature which would increase the retrieval accuracy. It is interest point detector and descriptor generally used in computer vision application and deals with gray scale images.[4]

III. PROBLEM STATEMENT

The CBIR is the recent techniques which is used to find the similar images from the database. But making it properly run for huge database by using minimum software is a challenging task. The retrieved images sometimes are not accurate; earlier a code was developed which would provide the approximate results e.g. if we send a query image and search that image in the software it would search for the similar image on the basis of color ie. First it would convert the image from RGB to graysale then on the basis of the hue to the particular color would provide a result. Further the result will consist of 4 images the sequence is generated on the basis of time caculted by software lesser the time taken more will be probability that it would match the query image.The results were not satisfactory.

A. Basic concept

Thus to eradicate this problem CBIR is updated with recent changes. The basic architecture of CBIR system is shown below:

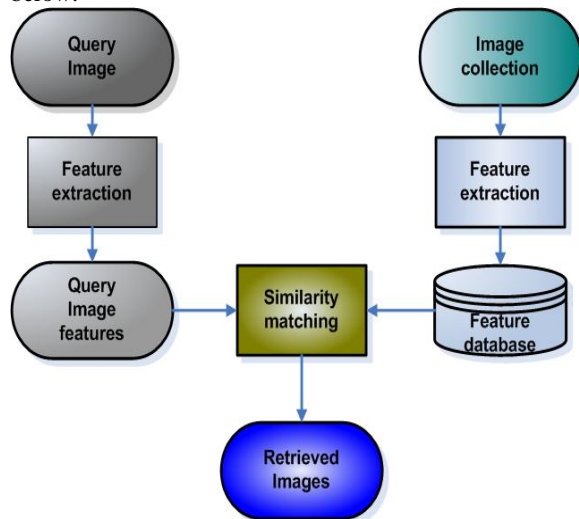


Fig. 1 Architecture of a content- based image retrieval system.

The architecture of content based image retrieval is shown Here the first block is of query image which needs to be searched in the database; but before searching it its features are extracted and are stored in query image features. Then on the other hand we have collection of images their features are also extracted. While retrieving the image the similarity of features is checked and the features which are closer to the query image features the corresponding image of that features is shown.

B. Content properties of image used for Retrieval

The best way to find the image is to search the image using the features such as shape, color, and Texture. This makes the task easy and more reliable.

1) *Retrieval of image on the basis of color:* There are various features extraction techniques but color is considered to be most dominant and distinguishing visual feature. The main reason is that it uses histogram to describe it. A color histogram is created which tells whole color distribution in an image and thus used in CBIR. Color histogram has various advantages such as high speed, use less memory space, and it is not sensitive with change in size and rotation of image so gains maximum attention.[1]

2) *Retrieval of image on the basis of texture:* Texture has the property to describe the visual pattern of all surfaces. It has important information about the structural arrangement of the surface such as: fabric, birds, wood , bricks, river etc. It describes the relationship of the surface with the surrounding environment. Thus texture feature gives full information of physical composition of a surface.[5]Textures are also

classified on the basis of their brightness due to high frequency in their image spectrum. It is useful to differentiate between the areas with similar color i.e.(sky and sea, grass and leaves). The best method to choose while comparing similar texture is second order statistics estimated from query and stored images. These estimate the relative brightness of picked pair pixels from each image. From these it is possible to measure the image texture such as contrast, coarseness, directionality and regularity[8] or periodicity, directionality and randomness.[6]

3) *Retrieval of image on the basis of shape:* Shape information are extracted using histogram of edge detection. Techniques for shape feature extraction are elementary descriptor, Fourier descriptor, template matching, Quantized descriptors, Canny edge detection [2] etc. Shape features are less developed than their color and texture counterparts because of the inherent complexity of representing shapes. [7] Shape may be defined as the characteristic surface configuration of an object; an outline or contour. It permits an object to be distinguished from its surroundings by its outline. Shape representations can be generally divided into two categories:[5]

- (a) Boundary-based, and (b) Region-based.

IV. PROPOSED SYSTEM

This consist of five steps:

1. Creating the databases from the images.
2. Extracting Features from the images which are stored in the databases.
3. Storing the extracted features of image in a database.
4. Creating the histogram of images and storing it in the databases.
5. Marking the matched points of query image with the image stored in the database using Surf Features.

First of all two databases are created. In databases we will store the images of our interest or according to the need of a particular Institution or Company. All these images are stored in a folder then the two cell are created in the mat file one is the filename which has names of all the images and other is data which contains all the properties of image i.e. rows column, type of image and matrix. A panel is created in GUI(Graphical user interface). The Graphical User Interface, or GUI, refers to the universal idea of icons, buttons, etc., that are visually presented to a user as a “front-end” of a software application. There are loads of reasons for creating a GUI. For instance, we might wish to automate a function that we use many times, or perhaps we want to share it with others who don't need, want, or care about knowing MATLAB or we would like to create an interactive demonstration.

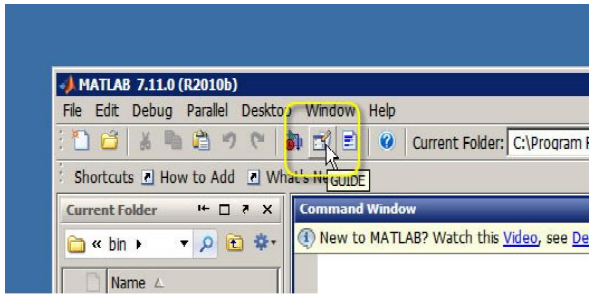


Fig. 2. Launching of Graphic User Interface

The next figure demonstrate the main panel of GUI (Graphic User Interface). This would help us in choosing the required GUI for our use if we select blank then we can also design our own panel where we can place the tools as per requirement.

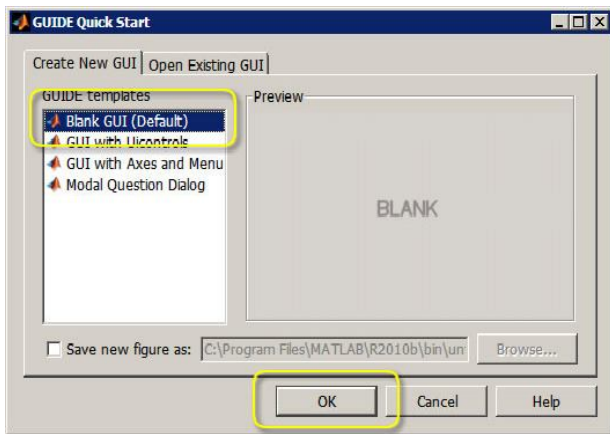


Fig. 3. Main panel of GUI (Graphic User Interface)

To start GUIDE, type: `guide` at the command prompt, or by selecting GUIDE from the launch pad. Once we have GUIDE running, all we need to do is to click on the object we want to create and drag it into the layout area. We should have an axis object, a static text objects for “ $x=$ ”, “ $y(x)=$ ”, and the status message area, and two editable text areas, one for the value of x and the other for the function $y(x)$. We also need two check box objects, one for “Grid” and one for “Box”. When we save or activate the figure, the second thing GUIDE will do is create an M-File to functionalize all our callbacks.

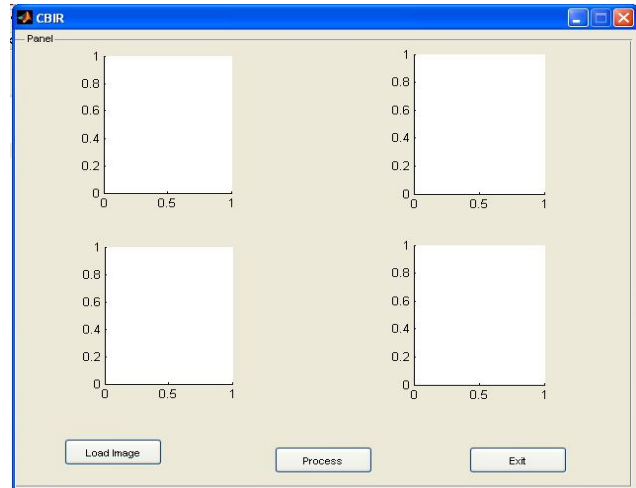


Fig. 4. Main panel for the search of images.

The GUI panel which I used in Thesis contains three push buttons i.e. Load Process and Exit as shown above on the click of every button some function is formed or it will navigate the position to some other location to do the task. By clicking on the load button we will be able to load the image from the database. When we click on the load button a window will pop up which contain the folder of images which are stored in the whole database. After that we will click on the query image i.e. the image which we want to search from the database. When the selection of query image is done i.e. the image which we required for our usage then we will click on the process button the moment we will click on the process button the code will start searching for the query image in the whole database by comparing the surf features points, its histogram and HSV features. The preprocessing is shown in figure below:

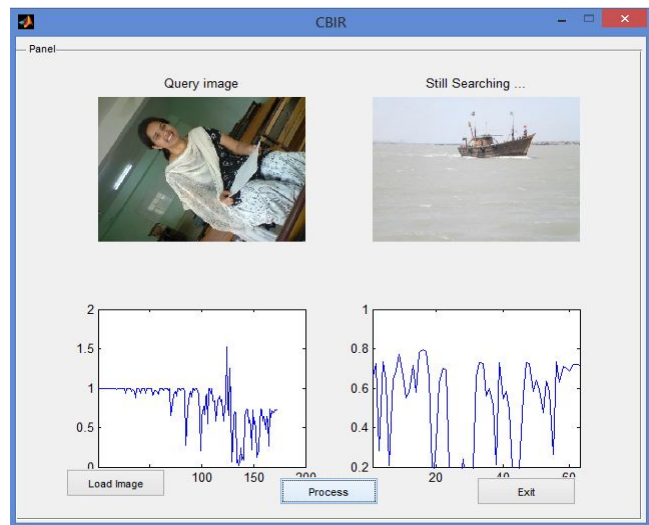


Fig. 5. Preprocessing of the image

If the query image exist in the database window will pop up which will give the information regarding the matched image an entitled the figure with "matched image". The result will be shown as below:

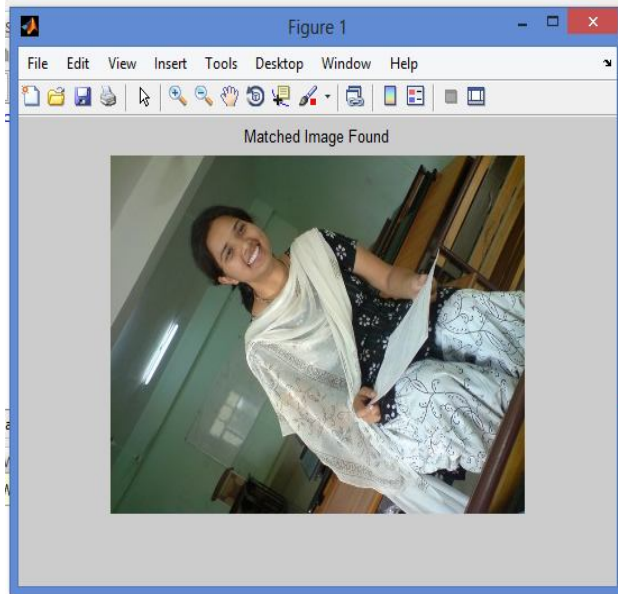


Fig. 6. Final result when image is matched

On the other hand if the query image do not exist in the database it will show image not matched in the command window. For matched images it will also show the interest points of image using surf features matched with the query image with respect to database image in the command window. So to perform the full task we need to combine the mat-lab m-files with the GUI. Mat-lab will have the all m-file which will able to convert the RGB image into HSV then making histogram after then marking the interest points providing the threshold after which the images will be matched. Exit button is used to end the task. Thus the retrieval of image is done hence our objective is achieved. This is the most easiest and precise way to retrieve image. Earlier the image retrieval was possible either using Histogram feature or by HSV technique or with the Surf algorithm with color features. But here in these thesis work has combined all the above techniques to retrieve the images from the database. Thus this helps to get the result quick and precise.

V. CONCLUSION:

In this paper to discover the desired result in minimal duration a new technology has been developed known as Content base image retrieval (CBIR) a technique for retrieving images on the basis of automatically-derived features such as color, texture and shape. This system is very useful as it confined the results and made easier for the person to discover results in the minimum possible period. This system has got various methods to obtain the data but here we are using histogram and color moments (hsv) with surf features of an image to achieve the verdict.

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