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Object Shape Storage and Retrieval – A Literature Survey

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ABSTRACT: Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies. It forms core research area within engineering and computer science disciplines too. We use a generic image model to represent the low level and high level logic of an image object.

KEYWORDS: Image retrieval, Shape detection, image enhancement, edge detection, content-based image retrieval, color, texture, shape.

I.INTRODUCTION

There are different kinds of images are available. Black and white, Gray scale and color images. Images can be associated with both low-level semantics. Image enhancement is the process of improving the quality of a digitally stored image.

Image enhancement technique falls into two categories namely spatial domain methods and frequency domain methods. The term spatial domain refers to the image plane itself, and approaches in this category are based on direct manipulation of pixels in an image. Frequency domain processing techniques are based on modifying the Fourier transform of an image. Enhancement techniques based on various combinations of methods from these two categories are not unusual. There is no general theory of image enhancement. When an image is in progress, the viewer is the only judge who monitors how well a particular method works. One goal in image restoration is to remove the noise from the image in such a way that the originalimage is perceptible. Multimedia information systems may be viewed as storage and retrieval systems where large volumes of multimedia data such as audios, images, and videos are created, indexed, modified, searched, and retrieved. In the last few years, content-based image retrieval has seen a great deal in the field of multimedia information systems

II.PROBLEM STATEMENT

Retrieval of Images, based on visual features of Images(shape and color) from the digital image library using relevant techniques and supervised learning method such as Support Vector Machine(SVM) which reduces the dimensionality and thus preserves useful information

III.PROBLEM DESCRIPTION

Recognizing shape is very crucial and it is a powerful descriptor of image content System retrieves the stored feature from the database by comparing the features of the query image against the images in the collection. Relevant to the image, the corresponding feature is choosed from the database Based on the shape , the image is extracted and displayed. The results are the images that its features are most similar to the query image.

Shape-based image retrieval should extract the shapes from images by segmentation, and classify the shape, where each shape should have their own representation and should variant to scaling, rotation, and transition

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The user need to choose an reference image or sketch a desired shape, since the user may not only want the shape that exact matched, so shape based image retrieval should be able to identify similar shapes.

IV. RELATED WORK

"Visual features are properties of an image which are being extracted using image processing, pattern recognition, and computer vision methods" [1].
The recent approaches use different combination of the visual features of the images to retrieve the required image [2], [3]
The authors in [4] had discussed many image retrieval methods and indexing methods
Color Extraction plays a vital role in the extraction of information from images. Color histograms are frequently used in CBIR systems [5], [6]
There are limitations of the histogram to be overcome than the other color features such as color moments and color sets representations are applied for image retrieval [6].
Filter extraction normally deals with removal of noise from color images. Several noise removing filters are proposed in the literature [7-9].
Shape is defined as the feature surface of an outline or object. The shape feature is used to separate objects from the background , surrounding by its outline representation. It can be categorized into two broad classification. Region based and boundary based image retrieval. Regional properties of images can be utilized, and segmentation can be used for color, shape feature extraction and spatial position of the regions.
In [10] a technique which is based on region is used for image retrieval. They use image segmentation in small regions. The images are retrieved on the basis of color, shape with a match with the query image. There are three methods for the detection of feature in an image; the non-parametric measure [13], the thresh hold based measure in which threshold is manually selected and the modified Hubert index [14].

V. PROPOSED WORK

1. Extract features of all the images available in particular image database class using the feature extraction methods.
2. Store all these features in the database along with some information which will be helpful for image retrieval
3. Design GUI for users through which users can provide the query image that he wants to search in the database by selecting one of the features.
4. Extract the features from query image and work out the similarity measures for query image and stored images.
5. According to the matched features and distances between query image and stored images retrieve images from database.

VI.SHAPE AND OBJECT DETECTION

Shape is a powerful descriptor of image content. The study of shape is more important for object recognition. Shape is probably the most important property that is perceived about objects. It allows predicting more facts about an object than other features, e.g. colouring.
Thus, recognizing shape is crucial for object recognition. In some applications it may be the only feature present
Shape is not only perceived by visual means but also provide shape information that are processed in a similar way.
"Edge detection" is one of the techniques to identify the shape of the object
Object detection is the process of finding and identifying objects in an image. Despite the fact that the object's image may vary somewhat in different viewpoints and sizes.
From among the digital images, detecting an object is a major task in image processing. Some techniques like Image Enhancement and Edge Detection are used to detect an object from digital images. Image enhancement is the process of improving the quality of a digitally stored image.

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VII. SUPPORT VECTOR MACHINE – STRENGTHS AND WEAKNESSES

Support Vector Machine is a group of supervised learning method which can be applied for classification and regression. There are some kernel based techniques namely Bayes Point Machine, Kernel principal component Analysis and Gaussian Processes. It analyzes data and identify pattern used for classification. It takes a set of input, read it and for each input desired output. Such type of process is known as classificationSupport Vector Machine is related to statistical learning theory. It is identified as one of the key area in Machine Learning

A.Strengths

- Training process is relatively easy
- No local optimal, unlike in neural networks
- It scales relatively well to high dimensional data
- Tradeoff between classifier complexity and error can be
- controlled explicitly
- Non-traditional data like strings and trees can be used as
- input to SVM, instead of feature vectors

B.Weaknesses

Choosing a good kernel function is necessary

VIII. EXTRACTION TECHNIQUES

Extraction and representation of object shape are relatively difficult tasksand have been approached in a variety of ways. We view shape representationtechniques as being in two distinct categories namely measurement-based methodsranging from simple, primitive measures such as area and circularity to the more sophisticated measures of various moment invariants and transformation-based methods ranging from functional transformations such as Fourier descriptors to structural transformations such as chain codes and curvature scale space featurevectors. An attempt to compare the various shape representation schemes

IX. IMAGE – A MODEL

An image is either an object or an entire image or some other meaningful portion(consisting of a union of one or more disjoint regions) of an image. For example, consider an image such as a scenery scene which consists of animals, trees and sky .Examples of image objects for this image would include the entire scene theanimal region, the tree region, the sky region, the grass region . Now, eachobject image in an image database contains a set of unique and characterizedfeatures F = {f1, ..., fk}. These features can be global or local We believe that
the nature as well as the spatial relationships of these various features can beused to characterize the corresponding image objects

X. TECHNIQUE 1:EDGE DETECTION

Edge is defined as changes of discontinuities in an image. There are three types of edges namely horizontal, vertical and diagonal edges. There are some masks for edge detection such as Prewitt Operator, Sobel, Robinson Compass and Laplacian Operator. All these masks derive the edges in any order either vertically or horizontally, one direction or two direction.

There are many ways to perform edge detection. However, it is grouped into two categories namely gradient and Laplacian.

The gradient method detects the edges by looking for the maximum and minimum in the first derivative of the image. The Laplacian method searches for zerocrossings in the second derivative of the image to find edges

Edge detection techniques are Canny-edge detection and Sobel-edge detection. Among the two techniques, the canny edge detector is able to detect maximum number of edges. Canny's edge detector- gives very good results for detecting horizontal and vertical edges[11].It detects the circular edges and edges at the corner

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XI.TECHNIQUE 2: IMAGE ENHANCEMENT

Image Enhancement is sharpening of image features such as edges, boundaries , contrast etc…. to improve visual appearance and analysis. The major challenge in image enhancement is the qualification of the enhanced feature criterion. There are many enhancement techniques namely Point operation, Spatial operation, Transform operation and Pseudo coloring

XII.TECHNIQUE 3: COLOR EXTRACTION

Extraction of colors areused to represent the color distribution in an image. Each image in the database is computed to obtain the color histogram. It counts the number of occurrences of each unique color on a sample image.The colors existing on the image can be identified with their corresponding areas as the number of pixels.
The color histogram of each image is then stored in the database. When the user does the search by specifying the query image, the system registers the proportion of each color of the query image and goes through all images in the database to find those whose color histograms match those of the query most closely.
The appropriate image with respect to color is extracted.

XII.CONCLUSION

In this paper, we have described the learning techniques of image query interface of our system. We have developed an image model that models the spatial relationships of various features of an image object.we have defined four types of image queries, which are well supported by the front end of our image query interface and the backend of our image index storage.We are now removing the unwanted elements of the object-based image model so as to integrate more features such as color and texture . This study is only a principle test and a much larger image database isrequired for real testing.In comparison with other methods, the matching algorithm provides a clear view which can be used in shape similarity retrieval.The shape based clustering features also helps to score more accurate evaluation and better in computation time.

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