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Review of CBIR System

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Abstract-With the advent of technology and multimedia information, digital images are increasing very quickly. Various techniques are being developed to retrieve/search digital information or data contained in the image. Traditional Text Based Image Retrieval System is not plentiful. Since it is time consuming as it require manual image annotation. Also, the image annotation differs with different peoples. An alternate to this is Content Based Image Retrieval (CBIR) system. It retrieves/search for image using its contents rather the text, keywords etc. A lot of exploration has been compassed in the range of Content Based Image Retrieval (CBIR) with various feature extraction techniques. Shape is a significant image feature as it reflects the human perception. Moreover, Shape is quite simple to use by the user to define object in an image as compared to other features such as Color, texture etc. Over and above, if applied alone, no descriptor will give fruitful results. Further, by combining it with an improved classifier, one can use the positive features of both the descriptor and classifier. So, a tryout will be made to establish an algorithm for accurate feature (Shape) extraction in Content Based Image Retrieval (CBIR). The main objectives of this project are: (a) To propose an algorithm for shape feature extraction using CBIR, (b) To evaluate the performance of proposed algorithm and (c To compare the proposed algorithm with state of art techniques.

Keywords: SVM, Legendre Moments, Segmentation, Statistical Features

I. INTRODUCTION

Content based image retrieval system is a very important task in digital image processing based systems. Normally the data base of images becomes stacky as the no. of images are added on during the scanning processing like in schools, colleges, municipality, registrar offices etc. This is due to the fact that in each government offices, all the records are being digitized for fast retrieval of the same. This gives rise to stack of images building up in image data base.

Now, the problem occurs when images belonging to a query property are sought from the data base. This becomes a very tedious task for a large data base. Here, comes the need of the content based image retrieval system. The image data base can be organized in way so as to flag the images with some keywords. These keywords may in future become the index for cbir systems. However, in the presented approach, the cbir system consists of an engine that itself determines the contents of the image based on input property and from the data base images as well. The data base images those show close resemblances to that of the query image in terms of features set are retrieved and the process is termed as content based image retrieval system.

II. RELATED WORKS

CBIR

Content Based Image Retrieval (CBIR) is a prominent area in image processing due to its diverse applications in internet, multimedia, medical image archives, and crime prevention.Improved demand for image databases has increased the need to store and retrieve digital images. Extraction of visual features, viz., color, texture, and shape is an important component of CBIR. Out of these, Shape is one of the primary visual features in CBIR [2]. Content-based image retrieval (CBIR) is the set of techniques for retrieving relevant images from an image database on the basis of image features automatically extracted from an image database [10].

SHAPE

Shape descriptors fall into two categories i.e., contour-based and region-based. Contour-based shape descriptors use only the boundary information by ignoring the shape interior content while region-based shape descriptors exploit interior pixels of shape. Region-based shape descriptors can be applied to more general shapes [2].

IMAGE MOMENTS

Image moments and their functions have been utilized as features in many image processing applications, viz., pattern recognition, image classification, target identification, and shape analysis. Moments of an image are treated as region-based shape descriptors. However, contour-based shape descriptorshave limitations of extracting complex shapes. Hence, region based shape descriptors viz.,Moment Invariants (MI) , Zernike Moments (ZM) , and Legendre Moments (LM) are preferred to represent the shape content of an image. An efficient shape descriptor should beaffine invariant, robust, compact, easy to derive, and match [2].

Traditionally, moments have been widely used in pattern recognition applications to describe the geometrical shapes of different objects. They provide fundamental geometric properties *(e.g.,* area, centroid, moment of inertia, skewness, and kurtosis) of a distribution. The moments can also be used to represent the pdf of pixel intensities of the image [5].

Image moments have been successfully used in image processing and pattern classification applications, for many years, as discriminative descriptors. Among all moment types, the orthogonal moments present considerable properties,since characterized by small information redundancy and high discriminative power [12]. The moment functions play an important role in the fields of

image processing and pattern recognition. The concept of orthogonal moments was first introduced by Teague. The orthogonal moments can be used as image feature descriptors with the minimum amount of information redundancy. Legendre moments belonging to the family of orthogonal moments, have been extensively used in many applications. [14] Image moments have been shown to be useful in image analysis, image watermarking, and invariant pattern recognition. These moments include continuous orthogonal Legendre moments (LLM) and discrete orthogonal moments [4].

EXACT LEGENDRE MOMENTS

Legendre moments are used in many applications such as pattern recognition, face recognition, and line fitting. It is well known that, the difficulty in the use of Legendre moments is due to their high computational complexity, especially when a higher order of moments is used. There are two goals: the issue of accuracy and the computational complexity. Many works have been proposed to improve the accuracy and efficiency of moment calculations, but those methods mainly focus on two-dimensional (2D) geometric moments. Those methods are relatively efficient, but not accurate enough, since the computation of Legendre moments is based on an approximate formula[1]. Legendre Moments (LM) are continuous and orthogonal moments, they can be used to represent an image with minimum amount of information redundancy. Many algorithms are developed for the computation of LM, but these methods focus mainly on 2D geometric moments. When they are applied to a digital image, a numerical approximation is necessary. Error due to approximation increases as the order of the moment increases [2]. The advantage of the use of Legendre transform is that it decomposes a given function defined on [-1, I] to a linear combination of orthogonal Legendre polynomials, and it is easy to estimate the approximation error from Legendre transform[6]. Moments can be used for estimating the histogram (or probability density function) of an image [10]. Legendre moments belong to the class of orthogonal moments and aremore compact in terms of information energy. Consequently the chromaticity distribution can be represented more efficiently by a small number of LCDM. This has a direct impact on both the retrieval time and storage space needed to save the feature vectors of the image database [11]. Recently, new formulas for accurate computation of the Legendre moments of an image have been introduced in. These formulas ensure better accuracy, since they are not constructed by a simple substitution of the double integral with a double summation, which may incorporate discretization errors. On the contrary, the proposed moments are being formed by mathematically integrating the Legendre polynomials over the corresponding intervals of the image pixels. Thus, the resulted moments take exact values and not approximate ones, as it happens through the traditional formulas [12]. The kernel of Legendre moments is the products of Legendre polynomials defined along rectangular image coordinate axes inside a unit circle [13]. The moments using Legendre polynomials as kernel functions are denoted as Legendre moments. Legendre moments belong to the class of orthogonal moments. They can be used to attain a near zero value of redundancy measure in a set of moment functions so that the moments correspond to the independent characteristics of the image. The definition of Legendre moments has a form of projection of the image intensity function into Legendre polynomials [16].

III. PROPOSED ALGORITHM

The proprosed algorithm is as follows:

Step I: A data base of images is generated for testing and validation purposes.

Step II: A feature set consisting of Legendre moments of statistical features of the image segments in data base is generated. Similarly, the same feature vector for query image is generated.

Step III: Then based on error margin between data base image feature vector and query image feature vector, the relevant images are retrieved from the data base and presented to the SVM classifier for confirmation and efficient classification.

RESULTS AND CONCLUSION

The proposed wok is a review work and has been implemented in matlab 7.5 version tool. The images retrieved are at affair rate of accuracy. A data base of approximately 100 images is created. The data base is bifurcated based on shapes, color, size, texture and texts. Similar sort of query images are used to test and validate the system. The validation process is under way.

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