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Enhancement of Colored Images in Digital Image Processing

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Abstract*— *Image Mining is the process of searching and discovering valuable information and knowledge in large volumes of data of images. Image Mining is the popular image retrieval system by which the target image to be retrieved based on the useful features of the given image. In this paper basic introduction is provided under which image mining and Enhancement of colored images are also discussed. Detail of comparison study and conclusion and future work is also there.

Keywords*— *Image Mining, Enhancement of Colored Images, Mining System, Techniques of Digital Image Processing

I. INTRODUCTION

In this present scenario, image plays vital role in every aspect of business such as business images, satellite images, medical images and so on. Image mining is the process of searching and discovering. Enhancement of colored images is based on the visual content of the Image. Desirable features can be extracted based on the visual content of the Image. Color, texture, pattern, image topology, shape of objects and their layouts and locations within the image, etc are the basis of the Visual Content of the Image and they indexed.

Recently, several image mining algorithms have been proposed specially for color content. Here, in the following we review some of the valuable information and knowledge in large volumes of data of images.

Srinivasa, K.G., et al. [4] presented Generic Feature Extraction for Classification Using Fuzzy C Means Clustering. The raw data was pre-processed, normalized and then data points are clustered using Fuzzy C means technique. Feature vectors for all the classes are generated by extracting the most relevant features from the corresponding clusters and used for further classification. An important observation was that the classification accuracy obtained using Fuzzy C-Means clustering for generic feature extraction was very close to the accuracy of classification obtained by using problem-specific feature extraction such as ANN, (SVM), (BC), etc. Heusch, G., et al. [2] proposed Local Binary Patterns as An Image Pre-processing for Face Authentication. A texture representation is derived from input face before being forwarded to the classifier. The efficiency of the proposed approach is empirically demonstrated using both an appearance based Linear Discriminate Analysis (LDA) and a feature based Hidden Markov Models (HMM) face authentication systems on two databases. Conducted experiments show significant improvement in terms of verification error rates and compared with state of the art pre-processing techniques. Ryszard, S.C. [3] proposed Image Feature Extraction Techniques and Their Applications for CBIR and Biometrics Systems. In Content-Based Image Retrieval (CBIR), visual features such as shape, color and texture are extracted to characterize images. Each of the features was represented using one or more feature descriptors. During the retrieval, features and descriptors of the query were compared to those of the images in the database in order to rank each indexed image according to its distance to the query. The candidate's patterns were then retrieved from database by comparing the distance of their feature vectors. R. Datta et al. [12] defines CBIR as : Content based image retrieval is a technology that in principle helps to organize digital pictures archives by their visual content, by this definition anything ranging from image similarity function to a robust image annotation engine falls under the purview of Content based image retrieval. A. Yoshitaka et al. [11] in their paper used content based retrieval for multimedia databases. In this paper they mention CBR is not an individual entity but relies on underlying data model, a priori knowledge of the area of interest and the scheme for representing queries. S. Nandgopalan et al. [8] proposed a novel approach for generalized image retrieval based on semantic concepts like color, texture and edge histogram descriptor and Block Truncation Coding (BTC) are used to extract features for image dataset

A. Image Mining

Image mining normally deals with the extraction of implicit knowledge, image data relationship, or other patters not explicitly stored from the low-level computer vision and image processing techniques. That is the focus of image mining is in the extraction of patterns from a large collection of images, the focus of computer vision and image processing techniques is in understanding or extracting specific features from a single image.

Figure 1.1 shows the image mining process. The images from an image database are first preprocessed to improve their quality. These images then undergo various transformations and feature extraction to generate the important features from the images. With the generated features, mining can be carried out using data mining techniques to discover significant patterns.

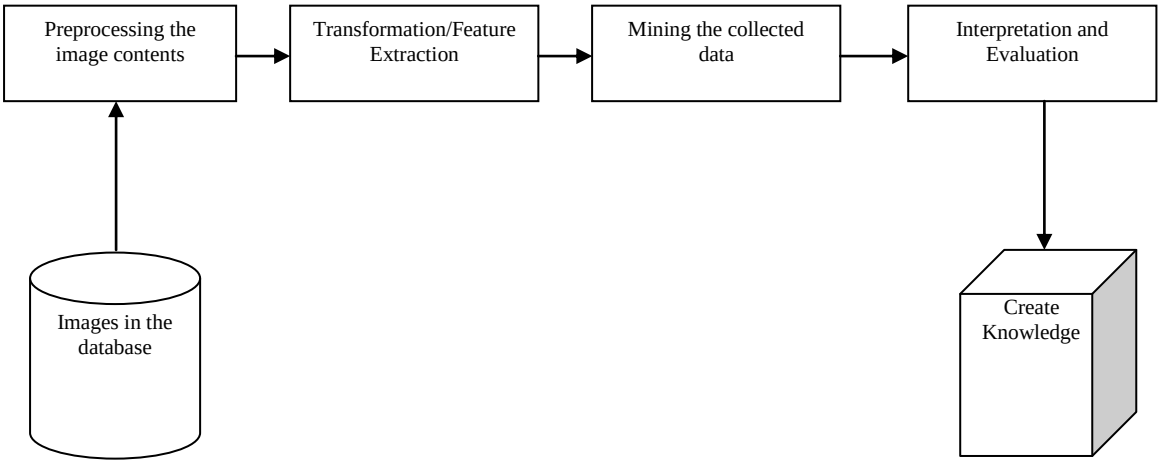

Figure 1.1 Image Mining Process

The resulting patterns are evaluated and interpreted to obtain the final knowledge, which can be applied to applications.

B. Usage of Image Mining

Image mining is the process of searching and discovering valuable information and knowledge in large volumes of data of images. Image mining draws basic principles from concepts in databases, machine learning, statistics, pattern recognition and 'soft' computing. Using data mining techniques enables a more efficient use of data banks of earth observation data i.e. in geographical surveys of Dams, Crops, cities from the pictures taken from the space etc. It is thus becoming an emerging research field in geosciences because of the increasing amount of data which lead to new promising applications. For example, the use of very high resolution satellite images now enables the observation of small objects, while the use of very high temporal resolution images enables monitoring of changes at high frequency. However, actual data analysis techniques suffer from the huge amount of complex data to process. Indeed, earth observation data (acquired from optical, radar and hyper spectral sensors installed on terrestrial, airborne or space borne platforms) is often heterogeneous, multi-scale, incomplete, and composed of complex objects. Segmentation algorithms, unsupervised and supervised classification methods, descriptive and predictive spatial models and algorithms for large time series analysis will be presented to assist experts in their knowledge discovery.

As images are mixer of numerical values from green, red and blue components taken with the help of cameras, we can process the content in the images by help of numbers of tools/ software's. Matlab is strong tool in image processing. It has been used on large scale by scholars, researchers, scientists, mathematicians all over the world.

II. ENHANCEMENT OF COLORED IMAGES

The images are based on the visual content of the Image. Desirable features can extracted based on the visual content of the Image. The development of the images is based on the Content Based Image Retrieval system. Color, texture, pattern, image topology, shape of objects and their layouts and locations within the image, etc are the basis of the Visual Content of the Image and they indexed.

Color perception plays an important role in object recognition and scene understanding both for humans and for intelligent vision systems. Recent advances in digital color imaging and computer hardware technology have led to an explosion in the use of color images in a variety of applications including medical imaging, content based image retrieval, digital in painting, remote sensing, visual quality inspection, among many others. As a result, automated processing and analysis of color images has become an active area of research, which is witnessed by the large number of publications during the past two decades. The multivariate nature of color image data presents new challenges for researchers and practitioners, as the numerous methods developed for single channel images are often not directly applicable to multichannel images. In addition, common scalar image processing operations often become computationally intractable when performed in high dimensional spaces. As result, development of computationally practical methods for color image processing has become an important research area.

The Several features that are used in the mining system are the following:

A. Color Features

The color of an Image is very robust to background, orientation, scaling and texture of the Image. In the terms of digital imagery the color pixels is the combination of (RED, BLUE and GREEN). It is well known fact that any color combination of these three colors can produce any color. The HSV color space is depicted below, because that is widely used in the CBIR community.

B. Color Histogram

Color histogram is a representation of the distribution of colors in an image. The color histogram can be built for any kind of color space, although the term is more often used for three-dimensional spaces like RGB or HSV.

C. Color Coherence Vector

The color coherence vector based approach was designed to accommodate the information of spatial color into the color histogram.

D. Texture Features

Texture is a very interesting image feature that has been used for characterization of images, with application in content based image retrieval. a major characteristic of texture is the repetition of a pattern or patterns over a region in an image. The elements of patterns are sometimes called textons. The size, shape, color, and orientation of the textures can vary over the region.

Recently various techniques are used for Enhancement of digital image processing which are discussed below:

A. Median Filter

The best know statistics filter it also s the median filter in digital image processing. The median filter is the simple technique and it also removes pulse or spike noise. The median filter is considers each pixel in the image in turn and its nearby neighbors to or not it is representative of its surroundings.

B. Weiner Filter

It was purposed in year of 1942after N. Weiner. Weiner filter applied to an image adaptively, tailoring itself to local image variance. Where the variance is large, wiener filter performs little smoothing. Where the variance is small, Weiner filter performs more smoothing.

C. Homomorphic Filter

Homomorphic filtering is a generalized technique for single and image processing .Homomorphic filter is used for enhancement of image. It is also used to remove multiplicative noise.

D. Gaussian Filter

Gaussian filter is statistical noise that has its probability density function equal to that of normal distribution, which is also known as the Gaussian distributed. The values that noise can take on are Gaussian distribution.

E. Discrete Wavelet Transform

Wavelet transform represents an image into wavelet function with different locations and scales. The discrete wavelet transform has gained wide popularity due to its many modern image and video compression systems embody the DWT as the transform stage. It is recognized that the 9/7 filters are among the best filters for DWT-based image compression.

TABLE I
COMPARISON STUDY

Technique	**Complexity**	**Noise Reduce**	**Frequency Rate**
Median Filter	Simple	Speckle/ Pluses	Low
Weiner Filter	Complex	Additive Noise	High
Homomorphic Filter	Generalized	Multiplic -ative Noise	High
Gaussian Filter	Multilevel Decomposition	Additive / Yield white Noise	Good
Discrete Wavelet Transform	Statistical	Video/ Row Wise Noise	Fair

III. CONCLUSIONS

The concepts of Enhancement of colored Images have been explained here. This paper presents a frame of Enhancement of image by using Erosion and Dilation to labeled image. Calculating the quantity of different color objects along with their marking can be done as a future work.

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