COMPARITIVE STUDY ON LOW LEVEL FEATURES IN CONTENT BASED IMAGE RETRIEVAL

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ABSTRACT
CBIR is the most powerful method for retrieving color, shape, and texture. The paper represents the fundamental aspects of CBIR which tries to extract the features of the image similar to user-defined specification (e.g., shape sketch, image, color etc). In this paper, we see the different type's techniques of content-based image retrieval for different application purpose and discuss the Local binary pattern. Local Derivative Pattern was proposed used for face recognition with a high order local pattern descriptor. LTP is more resistant to noise, but no longer strictly invariant to gray-level transformations. Ltp partially solves the noise sensitive problem by coding the small pixel-difference into a separate state. The local difference between the referenced pixel and its possible neighbors shows the information by the LMEBP. (LMECoP) extract the features images from a large database.

Index Terms—Image retrieval; Content-based image retrieval; Gabor filter.

1. INTRODUCTION

Content-Based Image Retrieval is a way of access Digital images an image from a large number of databases that are hard to find. Another name of content-based image retrieval is and Content Visual Information Retrieval and QBI Content. CBIR extract feature based on the original content to provide the efficient answer. Content-based image retrieval searches the image with the help of such as code, label, and representation associated with the image. It used the low-level features like textures, shape and, the color which give efficient answers.

2. RELATED WORK

K. Haridas et al.(204) proposed image retrieval post-processing step by find the image similarity clustering to reduce the images retrieving using Texture Feature Extraction and Color Feature Extraction [2].

K. Nirmala eta (2013) proposed Comparative Analysis of Content-Based Image Retrieval System Using Color Texture and It is a natural property of surfaces and it gives visual patterns of the image. It contains critical details regarding the structural arrangement of the surface.[3]

W.Niblack et al proposed Content-based Image Retrieval based on Color, Texture and Shape features using Image and its complement. Color, texture and shape information have been the primitive image descriptors in Content-based Image Retrieval systems [6]

Pietikäinen, M., Ojala, T., & Xu, Z. (2000). has given the comparison of three different approaches of CBIR based on image features and similarity measures taken for finding the similarity between two images. Results have shown that selecting an important image feature and calculating that through a meaningful way is of great importance in image retrieval [13].

Ahonen, T., Hadid, A., & Pietikainen, M. et al. (2006) proposed a fast image retrieval algorithm called feature levels. Feature levels algorithm works with the classification of image features to different categories or levels, feature extraction in terms level and feature similarity comparison of the query image with database images[14].

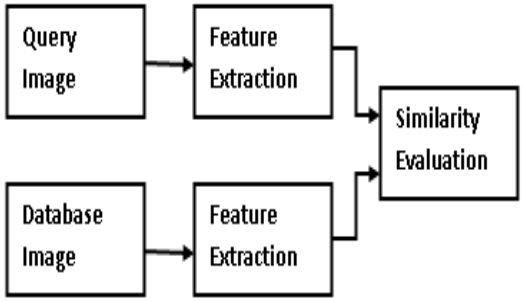
S. M. H. Khan, A. Hussain and I. F. T. Alshaikhl et al. (2013) content-based image retrieval and querying the indexed collections of images from the large database are required to access visible facts and visual information. Three of the principal additives of the visual images are texture, shape, and color. Content-based image retrieval from big sources has a wide scope in many application areas and software's[17]

D.Jeyabharathi and A. Suruliandi et al. (2013) proposes a novel technique for texture image retrieval based on Detroit transforms. Metro lets provide fine texture information due to its different way of analysis. Tetrominoes are applied at each decomposition level of an image and best combination of tetrominoes is selected, which better shows the geometry of an image at each level for the image [18].

G. Raghuwanshi and V. Tyagi et al. (2013) presented a novel approach in content-based image retrieval (CBIR) by combining the low-level feature i.e. color, texture and shape features. At first, they are transforming the color space from RGB model to HSV model and then extracting color histogram to form color feature vector [20].

3. Low Level Features In Images

The feature of an image is extracted in many ways. A Feature is provided the good result in CBIR systems .example: Color, Texture, and Shape:



Block Diagram of CBIR

3.1 Color

Color is primarily interrelated with coloring attributes of an image. Colors are divided into three part of the dimensional, module. Red, Green, Blue, Cyan, Magenta, Yellow, HSV Hue, Saturation, Value and Luminance, Hue and Saturation are the most important color .CBIR can be partticiply in many ways like Histogram, Color moments, Color etc [1, 2].The color based image are based on histogram. The color packets indeterminate pixel distances is acknowledged as correlation of colors. It's used to provide an right spatial retrieval feature. Some methods are:-

3.1.1 Color Moments

The color description of the image is set by the moments. First, second and third central moment of each of the color approach is stored as a color feature.

3.1.2 Invariant Color Histogram

Theo Gevers et al., (2004) stated a robust histogram from highlighting color invariants for object recognition. The histograms are computed with the help of variable kernel density estimators.

3.1.3 Dominant Color

The first step to obtaining the dominant color is to make the histogram. The maximum size is interpreted as the supreme color of the region. The segmented region does not have a uniform color. The average color will not be a understand for the color features.

3.1.4 Color Histogram

The color histogram is to represent color feature of an image .Height of each bar represents an amount of particular color of the color space being used in the image .The value of color histogram statistics. The number of bins depends on a number of colors image. A color histogram are not define easily specialized the global and regional distribution of colors in an image. Color histograms are based on two types, global color histogram and local color histogram .A GCH takes color histogram of whole image are represents information to the full image, without concerning color distribution of regions in the image. In the LCH divides an image into fixed blocks or regions, and takes the color histogram of each blocks.LCH contains more information about an image, but when comparing images, it is large expensive. GCH is known as a traditional method for retrieving color based images.

3.2 Texture

Texture is using for the primary property recognition of images. The texture is a continual pattern of pixels, the extension of noise to the structure and their replace the frequencies result in textures. That can appear to be stochastic and unorganized. These properties are the visual patterns in an image and the properties of homogeneous do not response from the existence of a single color of pixel. [3]. It's a natural property of surfaces and it gives visual patterns of the image. It contains critical details about the structural

arrangement of the surface. It also gives the relationship between the side and external environment [4]. Texture features are using various methods like Gray Level Co-occurrence matrix, Gabor Transform and Tamura Features.

3.2.1 Grey level Co-Occurrence Matrics

Grey level co-occurrence is a matrix or we can also say it distribution. Its define over the image to be set of co-occurring values at given equivalent. The GLCM are created from a grey scale image. The GLCM is computed how frequently a pixel with grey level value occurs vertically, horizontally and diagonally.

3.2.2 The Gabor filter: It is used to extract image features, texture features. The basically analysis these are any specific frequency content to the image in specific directions in a localized region around the point. Frequency are representing of Gabor filters are claimed by many time period vision. The Gabor filter is used for the human visual system.

3.2.3 The Tamura features: It includes the contrast and coarseness. That is design in according to the psychological studies on the human identification of texture. There are three components are used in image retrieval systems such as query by image content [5,6] photo book[7]and decomposition. [8, 9] Any other approaches are provided to the described texture in terms of properties.

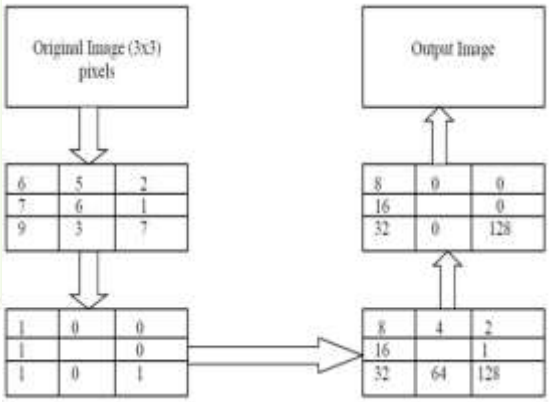
3.3 Shape

Shapes are used to recognize to natural object of the shape. It's the external form, contour or outline of an object irrespective of the color, texture or material composition. Many methods are described by the researchers to extract shape feature including Fourier Descriptors. There are two types: boundary-based and region based. Region –based: uses the entire shape region and Boundary-based: used to only outer boundary of the shape. [10], [11].

4. LOCAL FEATURES

4.1 Local Binary Pattern

Local Binary Pattern is a type of visual descriptor. It used for computer vision classification. It has powerful feature for texture classification. Its improve the detection performance of datasets [12-13]. The features for LBP was proposed by Ojala et al are dependent on rotational variant [14, 15].The concept of LBP was defined by Ojala et al for texture classification [16]. This method gives a robust way to define exact local patterns in the texture. The exact 3X3 neighborhood threshold values are defined by the center pixels that are added by binomial values for the equivalent pixels. The pixels being resulted is added for LBP number for the mentioned texture unit. The method LBP is known as a grayscale invariant and could be simply integrated with contrast measure by calculating the average gray level difference of every neighborhood with value 1 and 0 correspondingly as shown in figure *2.*



LBP Block diagram

4.2 Local Derivative Pattern

It was suggested by Baochang Zhang [17] for face recognition with high order local pattern representation. It converts guidance structure pattern based on a local derivative variation. It can be the artwork by the histogram to preserve the knowledge about the distributing of the local derivative pattern large patterns.LBP is also assigned first-order local pattern operator because LBP encodes all –direction first order derivative binary result whereas LDP encodes the higher-order derivative knowledge.

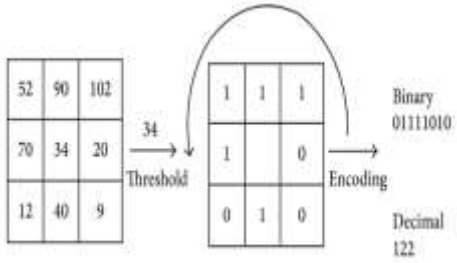
4.3LOCAL TERNARY PATTERN

Local Ternary pattern are extending of Local binary patterns. LBP does not threshold the pixels into 0 and 1, and earlier it uses a threshold constant to threshold pixels into three values. [18]Let us k as the threshold constant, c as the value of the center pixel, a neighboring pixel p, and the result of threshold is:

1. if p>c+k

o. if p>c-k and p<c+k
-1 if p<c-k (1)

Each threshold pixel has one of three values. Adjcent pixels are mix after threshold into a ternary pattern. Computing a histogram of these ternary values will result in a large range.Ternary pattern is split into two binary patterns. Histograms are create a description double the size of Local Binary Pattern. [19] The basic idea in the task is to convert from intensity space to an order space .The order of adjacent pixels is used to generate a monotonic change for each point in the image.



Example of LTP

4.4 Local Maximum Edge Binary patterns

Local Maximum Edge Binary patterns operate collect to the knowledge of maximum edge on basis of local difference magnitude among the reference pixel with required neighbors intended an image [20]. The LMEBP [21] operator collect max edge information based on the magnitude of local different b/w the reference pixel.

the Local Maximum Edge Binary Patterns code is collect for each reference pixel of an image. Local Maximum Edge Binary Patterns histogram is generated for the resultant LMEBP map.

4.5 Local Mesh Maximum Edge Co-occurrence patterns (LMeMECoPs)

The shape description Local Mesh Maximum Edge Co-occurrence pattern has been suggested for image retrieval system.[22] Color information is extracted from saturation, Hue, value Local mesh maximum edge co-occurrence patterns and combines with the color features with Indexing of color based image. It has been applied to Corel 10k and STex standard texture databases and has been compared with some existing methods. LMeMECoPs (local mesh maximum edge co-occurrence patterns) and combines with the color features with Indexing of color based image with the retrieval applications. The method connects the

Information of maximum edge between neighbors and then compile the maximum edge bits co-occurrence and are coded as patterns.

4.6 Local Maximum Edge Co-occurrence Patterns (LMECoPs)

Local Maximum Edge Co-occurrence patterns are collected local maximum edge information .23] some provided image, initially Local Maximum Edge Binary patterns is integrated and then the Co-occurrence matrix is being taken on the LMENP image. The provided Co-occurrence matrix is collected with Hue, Sturation, and value color histogram. RGB image is loaded and is being converted into HSV color space for the extraction of color features. Construction of H,S and V for space histogram is taken place. Later, the RGB image is converted into gray scale for the extraction of text features. This maximum edge information among the center pixel with its neighbors is collected and then the maximum edge patterns are calculated. A feature vector is formed by integrating the HSV histogram with Co-occurrence matrix. The best matches on the basis of similarity measures between the target image and the query image are calculated from the databases for retrieving the fine matches.

5. CBIR TECHNIQUES

Different types of CBIR techniques:

Content Comparison using distance measure: This process for evaluating two images into content based image is utilized distance measure for image. Image distance measure to the two images in the particular direction like color, texture, shape and others.

Semantic retrieval: CBIR is per fact process person perspective would contain known as semantic retrieval. The place the user makes a request like “to find pictures of Abraham Lincoln”. These sort of opened assignment is very complex for desktops. The excellent Danes seem distinctive & Lincoln does not deal with digital camera to the identical pose.

Common features for image Retrieval: These functions are outlined as capture a particular visual property of an image. Regularly, image features can be both worlds. The local aspects describe the visible content material of the complete image. Local features describe the areas or objects of the image content. The potential of global extraction is high speed for both extracting features similar. The global features are often too flexible represent an image. Specifically, they can be oversensitive to location and fail to visual characters. Global -feature approach give some preferred recovery adequacy over worldwide elements.

APPLICATIONS

There are different applications for CBIR:

a. Investigations: In investigation CBIR used as face recognition systems and copyright on the Internet.

b. Shapes Identification: In this identification of defect and fault in industrial automation.

c. Medical Diagnosis: In medical diagnosis CBIR plays very important role in Tumours detection, Improve MRI and CT scan Understandability.

d. Remote Sensing: satellite images. weather forecast, Various information systems.

e. Art galleries, Trademark Databases.

CONCLUSION

The purpose of this study is to provide an overview about the concept of content based image retrieval functionality of content based image retrieval system. color ,texture and shape used to improve the performance of content based image retrieval. In this approach Today's must be required to handle millions of images in technological environment ,but not hundreds of millions. As discussed in this paper ,we present the various local pattern feature descriptors .These descriptors worked on color or texture feature and also with combination of color and texture. The performance is being evaluated on the basis of three databases ,namely,Corel-5K,Corel-10K and MIT and Vistex database. These descriptors have significant results but still required more efficient techniques. This paper is a attempt of discover the CBIR techniques and their usage in quite a lot application domains.

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