

A Novel Approach For Content based Image Retrieval by using Histogram

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Abstract - In the world of digital image processing since the need for content- based image retrieval has increased with increment size and volume of digital images. In this paper we implement the effective framework which is used to retrieve most similar images from large images database for the image provided by the user. We proposed methodology, an image present by a set of regions, while comparison of images are posing, each image represent by a histogram, hence the estimation of the region correspondence transform into an histogram matching problem. In addition, by using and image distance concepts, the difference between images obtained. Experimental results show that the proposed histogram image matching performance is acceptable.

Key words - Text based image retrieval, texture, color and shape feature, Local tetra pattern

1. INTRODUCTION

As human being get image, sound and any other information by seeing, hearing, perception and analysis. Human judge similarly of images and sound according to their semantic content, for instance the searching for a star's picture is based on his facial character or other content. So the retrieval technique based on text or keywords for the digital multimedia apparently can't meet the claim that human being get multimedia information exactly.

Generally we preferred to search by text on search engine like Google, Yahoo, Mozilla firebox etc. i. e. the images stored in text notation user enter the text thus images are on the basis of these text.

The figure shows that result of search images with text notation.



Fig.1.1 Flowers images search on Google

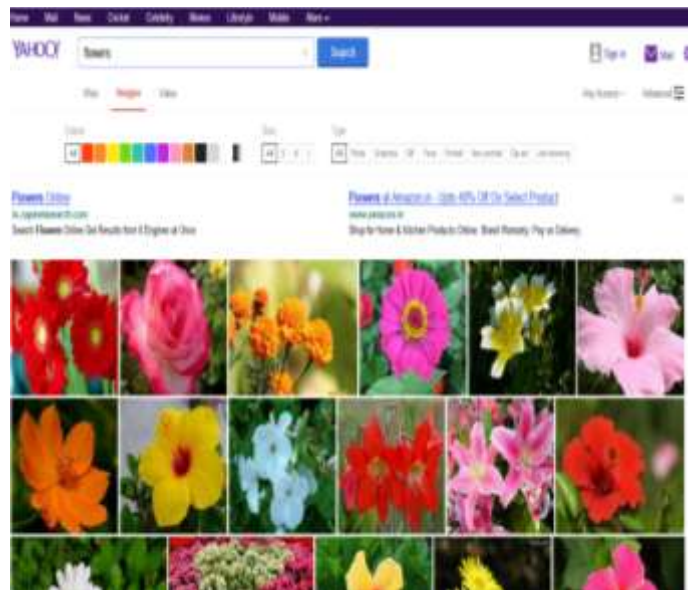


Fig.1.2 Flowers images search on Yahoo

Content based image retrieval (CBIR), also known as query by image content (QBIC) and content based visual information retrieval (CBVIR) is the application of computer vision techniques to the image retrieval

problem. That is, the trouble of searching for digital images in large database.

Content based image retrieval (CBIR) was proposed in the 1990's content based image retrieval (CBIR) is a very important and prominent area in image processing due to its diverse application in inter multimedia, companies image archives and media image archives.[2]

Yong Rai and Thomas S. Huang has discuss the part and current technique of CBIR system and proposed the new algorithm for fast retrieval image in huge amount of image collection. The method uses three database such as Image Collection, visual feature, and text annotation. In image Collection used do store the unprocessed objects using wavelet Compression, visual content (colours, texture and shape) entreated from query image store in visual feature, keyword store in text annotation [3].

The CBIR System

The inside every images having colour, texture, shape and also low level and high level feature Images are naturally endowed with attributes or information content that can help in resolving the image retrieval problem. The information content that can be resultant from an image is classified into three levels.

Low level - They include visual feature such as colour, texture, shape, spatial information and motion.

Middle level - Examples include presence or arrangement of specific types of objects, roles and series.

High level - Include impressions, emotions and meaning associated with the combination of perceptual features. Examples consist of objects or scenes with emotional or religious significance.

The image content level is also a measure of stage of feature extraction. At the low level, also consider as primary level the features extracted (color, shape, texture, spatial information and motion) are called primitive features because they can only be extracted by information obtained at the pixel level, that is pixel description of the images. The middle level features are features that can be extracted by collection of pixels that make up the image, while high level features goes beyond the collection of pixels. It identifies the impressions, meanings and emotions area related with the collection of pixels that make up the object.

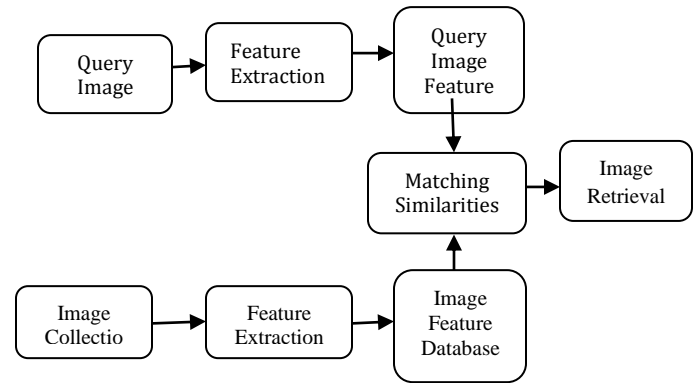


Fig1.3 Block representation of CBIR system

2. TEXT-BASED RETRIEVAL, CONTENT-BASED RETRIEVAL AND COLOUR-BASED RETRIEVAL

An image retrieval system is a computer system for browsing, finding and retrieving images in an image database. Text-based and content-based are the two techniques adopted for search and retrieval in image database.

In text-based retrieval, images are indicate using keywords, subject headings or classification codes, which in turn are used as retrieval keys during search and retrieval. Text-based retrieval is non-standardized because different users use different keywords for interpretation. Text descriptions are sometimes subjective and incomplete because it cannot illustrate complicated image features very well. Examples are texture images that can't be described by text. In text retrieval, humans are required to personally describe every image in the database, so for a large image database the technique is cumbersome, expensive and labour-intensive.

Content-based image retrieval (CBIR) technique use image content to search and retrieve digital image. Content-based image retrieval system was introduced to address the problems associated with text-based image retrieval, [3]. Advantages of content-based image retrieval over text-based retrieval will be mentioned in the next sections.

However, text-based and content-based image retrieval techniques complement each other. Text-based techniques can capture high-level feature representation and concepts. It is easy to issue text queries but text-based techniques cannot accept pictorial queries. On the other hand, content-based techniques can capture low-level image features and allow pictorial queries. But they cannot capture high-level concepts effectively. Retrieval systems exist which combine both techniques for more efficient retrieval.

3. IMAGE RETRIEVAL BY COLOUR

Colour feature is the largely sensitive and understandable feature of the image, and normally histograms technique used to demonstrate it. The advantages of Colour histograms technique have high speed, not required huge memory and not susceptible with the change in images size and other parameter. On the basis of Hue Saturation Value of color space calculating the color feature vector of searching image and database image. To increase the accuracy of image retrieval histogram technique is superior than Hue Saturation Value. R.Vijaya Arjunan and Dr.V.Vijaya Kumar has proposed the technique to obtain the color histogram. [6]

The following steps involve for retrieval of image by using colour feature

1. Feature Extraction
2. Histogram calculation
3. Similarity Matrix calculation
4. Dissimilarity calculation
5. Arrangement of Images in ascending order.

4. ANALYSIS OF IMAGE RETRIEVAL TECHNIQUE

The following table shows the analysis and comparisons of different technique for CBIR system

Sr. no	Year	Author	Proposed Method	Data Set Used	Parameter	Result
1	2005	Xiangyu Jinet.al [6]	relevanc feedback	34 categories image database taken 3500 images	no of feedback queries, composition of synthetic channels and Feedba	average P50 and P100

					ck strategies	
2	2010	Jame s Z. wang et.al [7]	Statistica l clusterin g on region features and IRM (Integrat ed Region Matching)	General purpose image datab ase includ ing about 200, 000 pictur es	Precisi on	average Precision is about 0.12
3	2010	Elif Albu z et.al [8]	vector wavelet coefficients of colour images	datab ase consis ts of 6,000 512X 512 Pixels natural image s	quality, efficien t and scalabil ity	Query search takes less than 40 m-sec on a 266 MHz
4	2013	Bor-Chun	Attribute enhance	LFW and	Parame ter λ	achieve

		Chen et. al [9]	d sparse coding and attribute embedded inverted indexing	Pubfig data sets	And diction ary size K	up to 44.5%
5	20 06	Kien A. Hua et.al [10]	Query Decomposition model	15,000 images from image database	Precision	average Precision is about 0.42
6	20 09	Sharadh Ramaswamy et. al [11]	Clustering based indexing technique	Cortina - Caltech 101 and Bio-Retina	Precision and Distance Ratio	100% precision.
7	20 10	Jun Wang et.al [12]	semisupervised hashing method	MNIST Dataset	Precision	Curve Plotted

8	20 08	Benjamin Sznajder et. al [13]	Classical techniques taken from the textual IR methods	Classical techniques taken from the textual IR methods	Effectiveness and Efficiency	94%
9	20 11	Zhong Wu et. al [14]	Identity based Quantization scheme	Labelled Face in Wild (LFW)	Mean average precision (mAP), Precision and Recall	Improvement is only 20.2 percent
10	20 07	Yuk Man Wong et. al [15]	Locality-Sensitive Hashing (LSH)	500,000 images crawled from Web.	Precision and Recall	Curve Plotted
11	20 12	Hao Xia et. al [16]	Kernelized Locality-Sensitive Hashing (KLSH)	INRIA Holidays data set,	precision and the mAP	significance level $\alpha = 0.05$.

				Image		
				CLEF Database		
12	2010	Eduardo Valle et. al [12]	approximate kNN search	SIFT dataset	Precision	Curve Plotted

5. METHODOLOGY

LOCAL BINARY PATTERN

Local binary pattern (LBP) is a type of optic descriptor used for classification in computer vision. LBP is the specific case of the Texture Spectrum model suggest in 1990. LBP was first described in 1994. It has since been found to be a strong feature for texture classification; it has further been determined that when LBP is merge with the Histogram of oriented gradients (HOG) descriptor, it enhanced the detection performance considerably on some datasets.

The Local Binary Patterns algorithm has its roots in 2D texture examination. The basic idea is to encapsulate the local structure in an image by comparing each pixel with its neighborhood. Get hold a pixel as center and threshold its neighbors against. If the intensity of the center pixel is identical its neighbor, then denote it with 1 and 0 if not. You'll end up with a binary number for every pixel, just like 11001111. With 8 surrounding pixels you'll end up with 2^8 possible combinations, that are called Local Binary Patterns or sometimes abbreviated as LBP codes. The first LBP operator used a fixed 3 x 3 neighborhood just like this

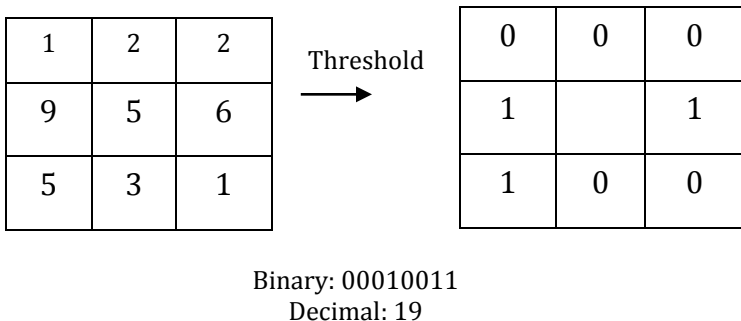


Fig.5.1 Representation of Local Binary Pattern

The LBP feature vector, in its easy form, is produced in the following manner:

Divide the examined window into cells (e.g. 16x16 pixels for each cell).

For every pixel in a cell, compare the pixel to every of its 8 neighbors (on its left-top, left-middle, left-bottom, right-top, etc.). Follow the pixels along a circle, i.e. clockwise or counter-clockwise.

Where the center pixel's value is higher than the neighbor's value, write "0". Otherwise, write "1". This gives an 8-digit binary number (which is usually changed to decimal for satisfy).

Compute the histogram, over the cell, of the frequency of each "number" happen (i.e., each combination of which pixels are smaller and which are greater than the center). This histogram can be view as a 256-dimensional feature vector. Optionally normalize the histogram. Concatenate (normalized) histograms of all cells. This gives a feature vector for the hole window.

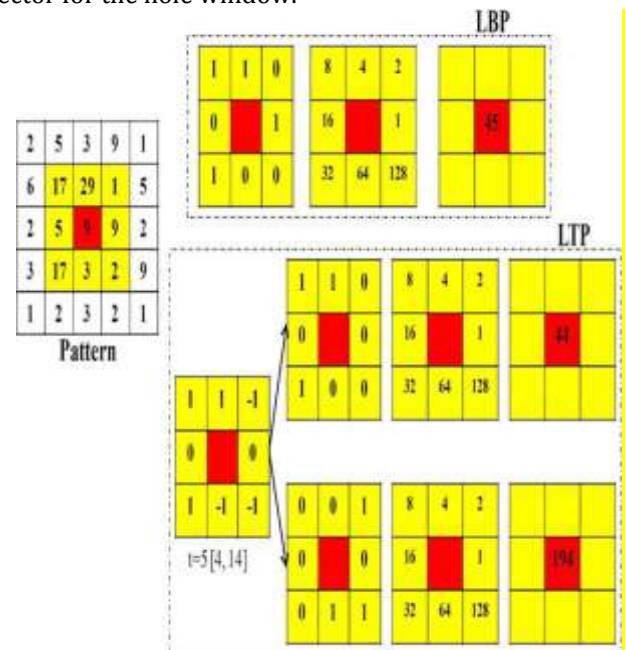


Fig.5.2: Computation of the LBP and LTP operators

In the LTP, the obtained ternary pattern is again coded into upper and lower binary patterns. The upper pattern is acquired by retaining 1 and replacing 0 for 1 and 0. Lower pattern is obtained by replacing 1 with 1 and 0 for 1 and 0. Structure of Proposed system. In this paper, assess the past and existing technique for image retrieval system by using text and optic feature. From the earlier section, we can see that a favorable image retrieval system requires the accurate mixing of numerous investigate communities' efforts. We propose a new retrieve technique for content based image retrieval (CBIR) using local tetra pattern (LTrPs). In local tetra pattern, the relation between the reference pixel and its neighbors are change it into coded

form and established on the directions that are measured by using the first-order derivatives in vertical and horizontal directions. Our system is different from the present local derivative (LDP) in a approach that it makes use of 0 degree and 90degree derivatives of LDPs for additional manipulate the directionality of every pixel. [18]

CONCLUSION

This histogram is totally different from accessible histograms, and the proposed color difference histogram uses the perceptually of the accessible histogram techniques simply focus on the frequency or number of pixels, which are used as the Histogram values. This algorithm can be considered as a generalize low-level feature representation. The suggested algorithm can be considered as an improved multi-text on histogram.

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