International Journal of Emerging Science and Engineering (IJESE)
ISSN: 2319–6378, Volume-2 Issue-5, March 2014

CBIR Representation In Terms of Rotation Invariant Texture using LBP Variance

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Abstract-Local rotation invariant feature extraction has been widely used in texture classification.. This paper proposes an alternative hybrid scheme, using LBP distribution, we first estimate the principal orientations of the texture image and then use them to align LBP histograms. Then the aligned LBP histograms were in turn used to measure different images from the database. A new texture descriptor, LBP variance (LBPV), is proposed to characterize the local contrast information into the one-dimensional LBP histogram. For more accurate result we propose a method to reduce feature dimensions using Euclidian Distance measurement. The experimental results of the databases show that the proposed LBPV operator can achieve significant Improvement, sometimes more than 10% in terms of classification point of view, over traditional locally rotation invariant LBP method.

I. INTRODUCTION

A. CBIR

Content Based Image Retrieval is a technique for retrieving images on the basis of automatically-derived features such as colour, texture and shape.. Current indexing practice for images relies largely on text descriptors. User satisfaction with such systems appears to vary considerably. Primitive features characterizing image content, such as colour, shape and texture are computed for both stored and query images, and used to identify (say) the 20 stored images most closely matching the query.

Generally evidence suggests that still images are required for a so many reasons which are as follows:

- display of detailed data (such as radiology images) for analysis,
- formal recording of design data (such as architectural plans) for later use.

Potentially, images have many types of attribute which could be used for retrieval, which are as follows:

- the presence or arrangement of specific types of object (e.g. chairs around a table);
- the depiction of a particular type of event (e.g. a football match); the presence of named individuals, locations, or events (e.g. the Queen greeting a crowd);
- subjective emotions one might associate with the image (e.g. happiness);

Manuscript received March 15, 2014.

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Accessing data by spatial location is an essential aspect of geographical data systems, and efficient methods to achieve this have been around for many years (e.g. Chock et al [1984], Roussopoulos et al [1988]). Similar techniques have been applied to image database, allowing users to search for images containing objects in defined spatial relationships with each other (Chang et al [1988], Chang and Jungert [1991]).

B. IMAGE RETREIVAL

Image retrieval is one of the main topics in the field of computer vision and pattern recognition. In the early 1990s, researchers have built many image retrieval systems, such as QIBC, MARS, FIDS and so on. They are different from the traditional image retrieval systems. These systems are based on image features such as color, texture of objects and so on. Nowadays, the main research work of image retrieval consists of feature extracting techniques, image similarly match and image retrieval methods.

C. LBP

Local binary patterns (LBP was first described in 1994. It has since been found to be a powerful feature for texture classification; it has further been determined that when LBP is combined with the **Histrogram Orientation** classifier, it improves the detection performance considerably on some datasets.

The simplest form of LBP feature vector, is created in the following manner:

- Divide the examined window into cells (e.g. 16x16 pixels for each cell).
- For each pixel in a cell, compare the pixel to each of its 8 neighbors (on its left-top,left-bottom, left-middle, right-top, etc.). Follow the pixels along a circle, i.e. clockwise or counter-clockwise.
- Where the center pixel's value is greater than the neighbor's value, write "1". Otherwise, write "0". This gives an 8-digit binary number (which is usually converted to decimal for convenience).
- Compute the histogram, over the cell, of the frequency of each "number" occurring (i.e., each combination of which pixels are smaller and which are greater than the center).
- Optionally normalize the histogram.
- Concatenate (normalized) histograms of all cells. This gives the feature vector for the window.

II. EXPERIMENTAL RESULTS AND DESCRIPTION

We have compared the query image with the data base images by using LBP Variance. Using LBP distribution, we first estimate the principal orientations of the texture image and then aligned them to measure the dissimilarity between different images of the data base. To further speed up the proposed matching scheme, we propose a method to reduce feature dimensions using Euclidian distance measurement.

Euclidian formula :

u1 = Euclidian_dist(H1,a1);
u2 = Euclidian_dist(H1,a2);
u3 = Euclidian_dist(H1,a3);
u4 = Euclidian_dist(H1,a4);
u5 = Euclidian_dist(H1,a5);
u6 = Euclidian_dist(H1,a6);
u7 = Euclidian_dist(H1,a7);
u8 = Euclidian_dist(H1,a8);
u9 = Euclidian_dist(H1,a9);
u10 = Euclidian_dist(H1,a10);
u11 = Euclidian_dist(H1,a11);
u12 = Euclidian_dist(H1,a12);
u13 = Euclidian_dist(H1,a13);
u14 = Euclidian_dist(H1,a14);
u15 = Euclidian_dist(H1,a15);
u16 = Euclidian_dist(H1,a16);
u17 = Euclidian_dist(H1,a17);
u18 = Euclidian_dist(H1,a18);
u19 = Euclidian_dist(H1,a19);
u20 = Euclidian_dist(H1,a20);

u1, u2 , u3 …..u20 are the results of all Euclidian distance measurements. Here H1 is query image selected by the user. A1….A20 are the data base images. An example has been demonstrated below

FIG. 1 Query Image

FIG. 2 Output Result

We performed experiments on two different conditions: When Euclidian Distance (u<=3) and when Euclidian Distance (u<=5)

FIG. 3 OUTPUT RESULT ((u<=3)

FIG.4 OUTPUT RESULT ((u<=5)

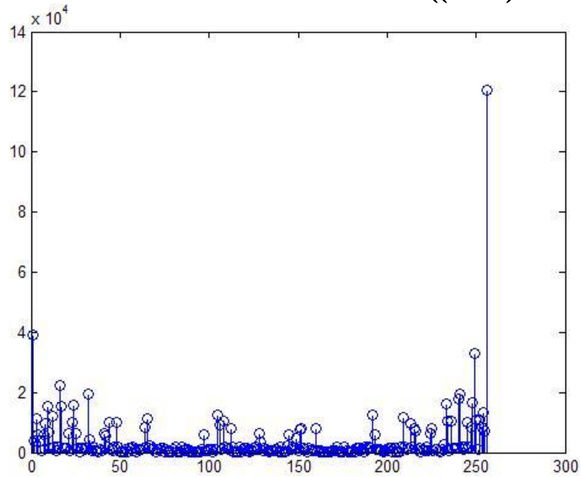

Fig. 5 Aligned histograms

III. CONCLUSION

In this Paper we have proposed a novel hybrid LBP scheme, which is based on LBP distribution. Based on this fundamental, the principal orientations of the texture image were first evaluated. Then the aligned LBP histograms were in turn used to measure different images from the database. Now to improve the performance of LBP a new texture descriptor has been used which is LBP Variance. To show the performance of the LBP Variance we have created a database of 20 images. So the result of this proposed method can be noted by using Euclidian distance (u) calculation as shown in the chat below.

Description	Euclidian distance (U<=3)
Different image	17.0880
Different image	26.7340
Different image	41.3080
Different image	6.9140
Query Image	0
Different image	5.6960
Possible image	2.5920
Different image	3.39
Different image	15.9
Different image	8.32
Different image	21.5
Different image	14.8
Possible Image	0.53
Different image	22.3
Possible Image	0.99
Different image	7.91
Different image	5.83
Different image	4.92

Different image	14.0

From the above chart it is clear that those images whose Euclidian distance are U<=3 are considered as different image. And those images whose equivalent distance is less than 3 are possible images i.e. they are nearly similar to the given query images.

ACKNOWLEDGEMENT

This research is supported by the Research and Development section of G.H Raisoni College of Engineering, Nagpur , India.

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