# An Image Data Mining with its Effective Local Binary Patterns (LBP) Detection & Extraction with Hierarchical Indexing- A Result Paper

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*Abstract*— Image recognition has been one of the most interesting and important research fields in the past two decades. The reasons come from the need of automatic recognitions and surveillance systems, the interest in visual system on Image recognition, and the design of -computer inter image, etc. These researches involve knowledge and researchers from disciplines such as neuroscience, psychology, computer vision, pattern recognition, image processing, and machine learning, etc. A bunch of papers have been published to overcome difference factors (such as illumination, expression, scale, pose, etc.) and achieve better recognition rate, while there is still no robust technique against uncontrolled practical cases which may involve kinds of factors simultaneously. Most of the current Image recognition systems presume that Images are readily available for processing. However, in reality, we do not get images with just Images. We need a system, which will detect the Image in image, so that this detected Image can be given as input to Image recognition systems. The goal of an Image detection algorithm is to identify the location and scale of all the Images in image. The task of Image detection is so trivial for the brain, yet it still remains a challenging and difficult problem to enable a computer to do Image detection. This is because the image changes with respect to internal factors like facial expression, beard and moustache, glasses etc. and it is also affected by external factors like scale, lightning conditions, contrast between Image and background and orientation of the Image.

***Key words:*** LBP, Image Extraction, Hierarchical Indexing

## I. INTRODUCTION

Image recognition is the process of automatically determining whether two Images are the same person. A number of factors make this a challenging problem for computers. Images in images and video can be captured at various resolutions, quality, and lighting conditions. Different cameras have different imaging properties. Moreover, people's facial expressions as well as their pose with respect to the camera can vary widely, and facial characteristics can change dramatically as people age over time.

Digital images and video are becoming more and more important in the multimedia information era. The Image is one of the most important objects in an image or video. Detecting the location of Images and then extracting the facial feature in an image is an important ability with wide range of applications, such as Image recognition, surveillance systems, computer interfacing, video-conferencing etc.

In this work, it is implemented an Image recognition method by Genetic algorithm. Genetic algorithms are a stochastic search algorithm, which uses probability to guide the search. It can find the near global optimal solution in a large solution space quickly. It has been used extensively in many application areas, such as image processing, pattern recognition, Image detection, feature selection, and machine learning. Its power comes from its ability to combine good pieces from different solutions and assemble them into a single super solution.

Our aim, which we believe we have reached, was to develop a method of Image recognition that is fast, robust, reasonably simple and accurate with a relatively simple and easy to understand algorithms and techniques. Given an image, the goal of Image detection algorithm is to detect the Image and extract the features from given image and to recognize the detected Image with given database of Image images which is trained by Artificial Neural Network using Genetic Algorithm.

## II. PROPOSED METHODS FOR IMAGE DATA MINING

Image Mining deals with the extraction of image patterns from a large collection of images. In Image Mining, the goal is the discovery of image patterns that are significant in a given collection of image. Image Mining deals with extraction of knowledge, image data relationship and other required patterns and uses ideas from image processing, image retrieval and machine learning, databases .The focus of image mining is on the extraction of knowledge patterns from a large collection of images. The fundamental challenge in image mining is to reveal out the knowledge relating to the images from the web pages. Object Recognition, Image Retrieval, Text based Image Retrieval ,Query Based Image Retrieval, Image Indexing Textual Image Mining, Content-Based Image Retrieval Techniques, Image Classifications, Image Clustering, Association rules mining, Neural networks etc.

## III. AN IMAGE DATA MINING WITH ITS EFFECTIVE LOCAL BINARY PATTERNS

### *A. Concept*

The LBP feature vector, in its simplest form, 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-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 greater than the neighbor's value, write "0". Otherwise, write "1". 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

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center). This histogram can be seen as a 256-dimensional feature vector.
- Optionally normalize the histogram.
- Concatenate (normalized) histograms of all cells. This gives a feature vector for the entire window.

The feature vector can now be processed using the Support vector machine, extreme learning machines, or some other machine-learning algorithm to classify images. Such classifiers can be used for face recognition or texture analysis. A useful extension to the original operator is the so-called uniform pattern, which can be used to reduce the length of the feature vector and implement a simple rotation invariant descriptor. This idea is motivated by the fact that some binary patterns occur more commonly in texture images than others. A local binary pattern is called uniform if the binary pattern contains at most two 0-1 or 1-0 transitions. For example, 00010000(2 transitions) is a uniform pattern, 01010100(6 transitions) is not. In the computation of the LBP histogram, the histogram has a separate bin for every uniform pattern, and all non-uniform patterns are assigned to a single bin. Using uniform patterns, the length of the feature vector for a single cell reduces from 256 to 59. The 58 uniform binary patterns correspond to the integers 0, 1, 2, 3, 4, 6, 7, 8, 12, 14, 15, 16, 24, 28, 30, 31, 32, 48, 56, 60, 62, 63, 64, 96, 112, 120, 124, 126, 127, 128, 129, 131, 135, 143, 159, 191, 192, 193, 195, 199, 207, 223, 224, 225, 227, 231, 239, 240, 241, 243, 247, 248, 249, 251, 252, 253, 254 and 255.

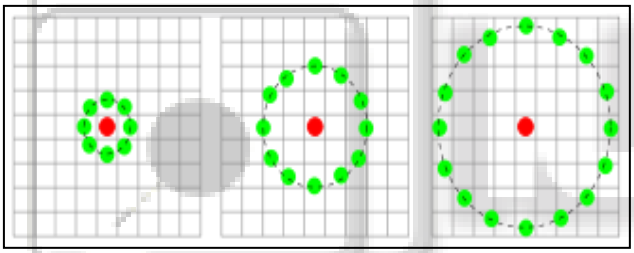


Fig. 1: Three Neighborhood Examples used to define a Texture and Calculate a Local Binary Pattern (LBP)

### *B. Calculation of LBP Values*

LBP method provides a robust way for describing pure local binary patterns in a texture. The original 3×3 neighborhoods threshold by the value of the center pixel. This threshold neighborhood pixel values are multiplied by binomial values of the corresponding pixels. Resulting pixel value is summed for the LBP number of this texture unit. LBP method is gray scale invariant and can be easily combined with a simple contrast measure by computing for each neighborhood the difference of the average gray level of those pixels which have the value 1 and those which have the value 0 respectively as shown in Fig.2

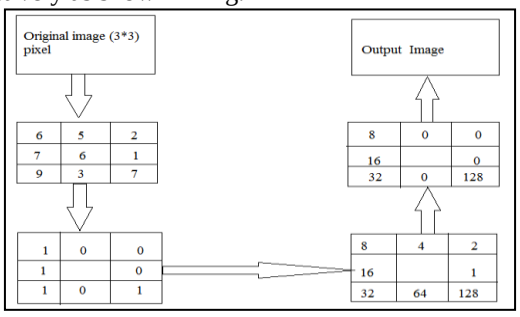



Fig. 2: Block Diagram of Local Binary Pattern (LBP)

LBP is a two-valued code. The LBP value is computed by comparing gray value of centre pixel with its neighbors, using the below equations (1) and (2).

$$LBP_{P,R} = \sum_{p-1}^{p} 2(p-1) * X(Gp - Gc) \dots\dots\dots (1)$$

$$X(x) = \begin{cases} 1, & x \geq 0 \\ 0, & else \end{cases} \dots\dots\dots (2)$$

Where,
Gc – Gray value of the centre pixel
Gp – Gray value of its neighbors
P - Is the number of neighbors

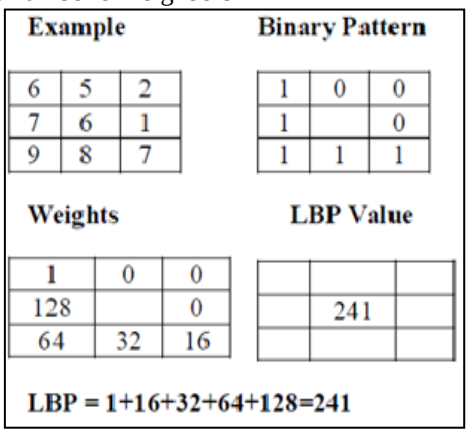



Fig. 3: Computation of LBP Value

In this way LBP codes are calculated for each and every segment of inputted image.

## IV. EXPERIMENTAL RESULTS & DISCUSSION

### *A. Introduction*

This chapter contains the result of an image data mining with its effective local binary patterns (LBP) detection and extraction with hierarchical indexing. The results are obtained after applying different techniques of CBIR with LBP. The results have been demonstrated in comparison tables, a graphical representation has also been done for a quick analysis of result. All techniques have been tested for all the assumed standard test images. Different types of result are extracted from image data mining system with LBP detection.

### *B. Histogram Result*

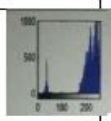
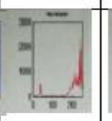
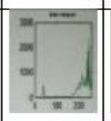
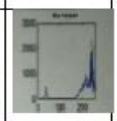
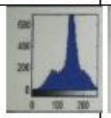
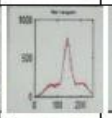
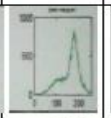
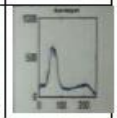
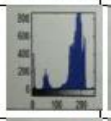
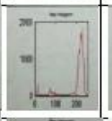
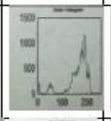
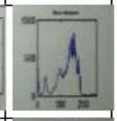
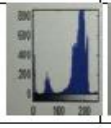
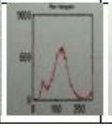
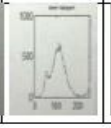
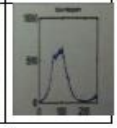
| Sr. No | Input image name | Input image | RGB Histogram | Red Histogram | Green Histogram | Blue Histogram |
|---|---|---|---|---|---|---|
| 01 | sky |  |  |  |  |  |
| 02 | sun flower |  |  |  |  |  |
| 03 | tree |  |  |  |  |  |
| 04 | rose |  |  |  |  |  |

Table 1: Comparison of RGB Histogram of Input Image

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Table 1 shows comparison of RGB histogram of inputted image. The work performed on inputted image i.e. it shows the RGB histogram and individual color histogram. In this comparison four images taken as examples. sky.jpg, sun.jpg, tree.jpg, rose.jpg are inputted training images. Average red, green, blue values are calculated for these images. Using that calculated values RGB histograms are constructed as follows.

### *C. Extract Image Parameter for Input Image*

The Table1 describes extracting parameter for image like its mean, average red, green, blue value, mean intensity, height

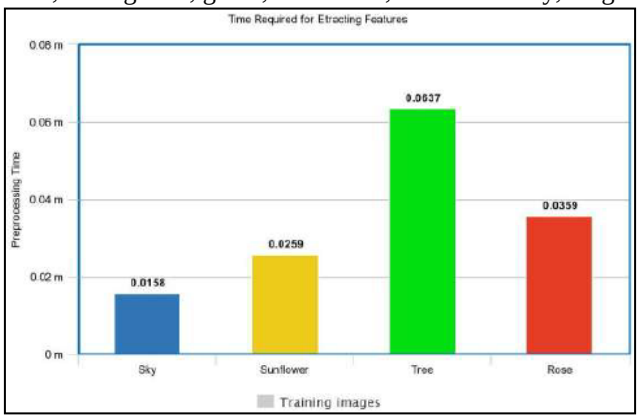


Fig. 1: Preprocess Image Time Graph

Fig 1 shows preprocessing time required for extracting image parameters from the input image. When user take input image, system extract its parameters like its mean, average red, green, blue value, mean of intensity, its height and width value.

### *D. Extract LBP Patterns for Training Images*

These calculated LBP values stored temporally in LBP New: Table. These values are compared with the values of images in the database LBP: Table.

After clicking on Extract Image button in CBIR menu, most matched images are extracted as a result. We get below result after testing test image with the database. The resulting images are extracted from image database with parameters like Image Deviation, Image Match, Retrieval Time, Image MSE, Image PSNR, Image Euclidian etc.

| Sr. No | Input image name | Input image | Image Deviation | Image Match | Retrieval Time | Image MSE | Image PSNR | Image Euclidian |
|---|---|---|---|---|---|---|---|---|
| 01 | sky |  | 0 | 100 | 0.0234 | 0 | 100 | 0 |
| 02 | sunf |  | 0 | 100 | 0.0156 | 0 | 100 | 0 |
| 03 | tree |  | 0 | 100 | 0.0456 | 0 | 100 | 0 |
| 04 | rose |  | 0 | 100 | 0.0897 | 0 | 100 | 0 |

Table 3: Comparisons of Parameters after Getting Exact Matched Image in Database

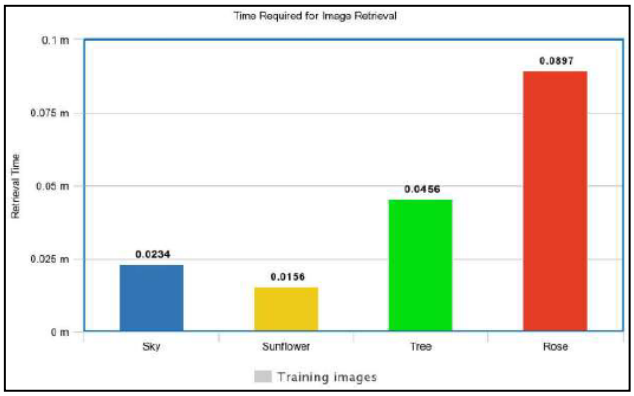


Fig. 2: Retrieval Time Required for Test Image from Image Database

Fig 2 describes the time required for compare test images with the huge database of training images. This time also contains retrieval of exact matched images from the database. By observation we get result that: when exact matched images are retrieved from huge database it required less than 1/10 part of minute. This result is much better than existing image mining techniques.

## V. CONCLUSION

An image data mining with detecting LBP patterns is a complex and mutable subject. In addition to algorithms, there are more things to think about. The study of image mining with CBIR and LBP detection reveals many conclusions, issues and thoughts. This chapter aims to explain and sort them; hopefully to be useful in future research.

We proposed a novel approach to detect LBP patterns and extract most matched images from huge image database. This approach is better as compared with other existing CBIR techniques.

The proposed method has been implemented using Matlab13 and tested on huge database containing 1,000 images of different photo, in all format of any size. The search is usually based on similarity rather than the exact match. We have followed the image retrieval technique, as described in the methodology. The query retrievals by the proposed method are shown in Figures 6.10, with an average retrieval time as 0.6530374 min. The whole indexing time for the 1000 image database takes 2-3 minutes.

This chapter summarizes that after testing with all techniques, this implemented method for image mining gives accurate 100% result if exact same image exist in image database.

Future Scope

There are some problems in image mining with LBP detection system like, two images having exact matching LBP patterns are not necessarily exact same images. Means that two different images can have same LBP patterns because LBP are calculated on pixel intensity values. So it will be our future scope of this project. Our future work will include other following points:

- Minimize the retrieval time of image and maximize the database capacity.
- The current work is based on Local binary pattern. So, in future Local ternary pattern, local tetra pattern can be

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used for image retrieval, it will give better and effective retrieval of an image.

## REFERENCES

[1] W. M. Smeulders, M. Worring, S. Santini, A. Gupta, and R. Jain, "Content-based image retrieval at the end of the early years," IEEE Trans. Pattern Anal.Mach. Intell., vol. 22, no. 12, pp. 1349–1380, Dec. 2000.
[2] T. Ojala, M. Pietikainen, and D. Harwood, "A comparative study of texture measures with classification based on feature distributions," Pattern Recogn., vol. 29, no. 1, pp. 51–59, Jan. 1996.
[3] T. Ojala, M. Pietikainen, and T. Maenpaa, "Multiresolution gray-scale and rotation invariant texture classification with local binary patterns," IEEE Trans. Pattern Anal. Mach. Intell., vol. 24, no. 7, pp. 971–987, Jul. 2002.
[4] M. Pietikainen, T. Ojala, T. Scruggs, K. W. Bowyer, C. Jin, K. Hoffman, J. Marques, M. Jacsik, and W. Worek, "Rotational invariant texture classification using feature distributions," Pattern Recogn.,vol. 33, no. 1, pp. 43–52, Jan. 2000.
[5] Z. Guo, L. Zhang, and D. Zhang, "Rotation invariant texture classification using LBP variance with global matching," Pattern Recogn., vol. 43, no. 3, pp. 706–719, Mar. 2010.

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