

# Security Approach by Face Recognition Using Android

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**Abstract--** This paper proposes the face identifying face characteristics for a person. As such, face recognition and detection algorithms have been the subject of hundreds of research papers, and algorithms have been designed for commercial use in digital cameras and phones. An Local gradient patterns (LGP) and binary histograms of oriented gradients (BHOG) algorithm is used to determine the location of the eyes, nose, and mouth of the face in the image. Based on these points, average human face proportions, image gradients, and edge detection of the face are then identified. This hybridization makes face and human detection robust to global illumination changes by local intensity changes by LGP and local pose changes by BHOG, which considerably improves detection performance.

**Keywords:** Local gradient pattern, binary histograms of oriented gradients, feature hybridization, face detection

## I INTRODUCTION

Face recognition is currently a very active research topic in the field of computer vision. Many algorithms or systems have been proposed for face recognition, and some of them have achieved encouraging performances in specific applications. Nowadays, it is very common for people to have mobile phones with an integrated digital camera. This gives the opportunity to develop a face recognition system on these phones. However, there are some differences between the conditions of PC and mobile phones. For example, there are only limited memory and computation power on most mobile phones. What's more, the different facial orientations and huge changes in illuminations and backgrounds are also challenging the face recognition on mobile phones. Taking the limitations above into account, we propose a fast and efficient face recognition system on. First, the optimization of an implementation of Open CV Viola algorithm is used to detect faces from the picture taken from the camera. An Local gradient patterns (LGP)[1] and binary histograms of oriented gradients (BHOG) [2]algorithm are used to determine the location of the

eyes, nose, and mouth of the face in the image. Based on these points, average human face proportions, image gradients and edge detection of the face are then identified.

Biometrics refers to the study of methods for recognizing humans based on one or more physical or behavioral traits. As a complementary or supplementary method to traditional person authentication, biometrics gets more and more popular. Among different biometric traits, face and palm print recognition receive great amount of attention in the past decade. They can get high recognition rate and are user friendly. There are many different algorithms proposed in the past, such as principal component analysis (PCA), Gabor phase encoding, and local binary pattern (LBP)[3] for feature extraction. Among them, LBP based method has shown its superiority in face and palm print recognition. LBP was originally proposed as a texture descriptor. It owns many advantages, such as it is simple to implement and fast to compute. It has been validated that uniform patterns play an important role in texture classification. Uniform patterns also showed its superiority in face and

palm print recognition. Incorporating uniform idea, many patterns, which are not “uniform” patterns, are clustered into one “non-uniform” pattern. And, the percentage of “non-uniform” patterns increases as the radius increases, so much information is lost. Recently, some works were proposed to address this issue. Many “non-uniform” patterns are isolated from the “non-uniform” cluster. However, such methods are learning based algorithms, which require some training samples to discover useful “non-uniform” patterns. Thus, the recognition performance may be related with the training samples. In this paper, we propose a hierarchical multi scale [4]LBP algorithm for face and palm print recognition. The LBPs for biggest radius is firstly extracted. Then, for those “non uniform” patterns, the counterpart LBPs of smaller radius is extracted.

## II LOCAL GRADIENT PATTERN (LGP) ALGORITHM

A local binary pattern (LBP) is a type of feature used for classification in computer vision. LBP. 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 Histogram of oriented gradients (HOG)[5] classifier, it improves the detection performance considerably on some datasets.

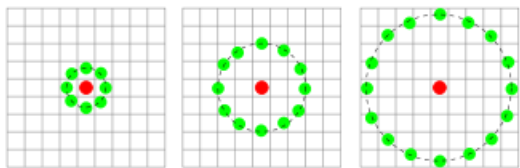


Fig 2.1: Three neighborhood to calculate a local binary pattern (LBP)

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 "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.

## BINARY HISTOGRAMS OF ORIENTED GRADIENTS (BHOG) ALGORITHM

Histogram of Oriented Gradients (HOG) is feature descriptors used in computer vision and image processing for the purpose of object detection. The technique counts occurrences of gradient orientation in localized portions of an image. This method is similar to that of edge orientation histograms, scale-invariant feature transform descriptors, and shape contexts, but differs in that it is computed on a dense grid of uniformly spaced cells and uses overlapping local contrast normalization for improved accuracy.

The essential thought behind the Histogram of Oriented Gradient descriptors is that local object appearance and shape within an image can be described by the distribution of intensity gradients or edge directions.[6] The implementation of these descriptors can be achieved by dividing the image into small connected regions, called cells, and for each cell compiling a histogram of gradient directions or edge orientations for the pixels within the cell. The combination of these histograms then represents the descriptor. For improved accuracy, the local histograms can be contrast-normalized by calculating a measure of the intensity across a larger

region of the image, called a block, and then using this value to normalize all cells within the block. This normalization results in better invariance to changes in illumination or shadowing.

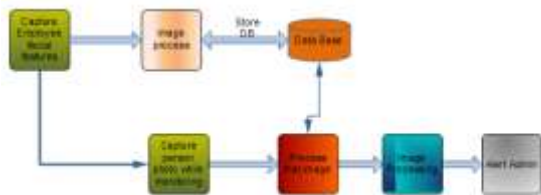


Fig 2.2: The Architecture diagram fro Face Recognition

The HOG descriptor maintains a few key advantages over other descriptor methods. Since the HOG descriptor operates on localized cells, the method upholds invariance to geometric and photometric transformations, except for object orientation. Such changes would only appear in larger spatial regions [7]. Moreover, as Dalal and Triggs discovered, coarse spatial sampling, fine orientation sampling, and strong local photometric normalization permits the individual body movement of pedestrians to be ignored so long as they maintain a roughly upright position. The HOG descriptor is thus particularly suited for human detection in images.

Local binary pattern (LBP), fast and simple for implementation, has shown its superiority in face and palm print recognition. To extract representative features, “uniform” LBP was proposed and its effectiveness has been validated. However, all “non-uniform” patterns are clustered into one pattern, so a lot of useful information is lost. A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source. One of the ways to do this is by comparing selected facial features from the image and a facial database. It is typically used in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems. The useful information of “non-uniform” patterns at large scale is dug out from its counterpart of small scale. The main

advantage of the proposed scheme is that it can fully utilize LBP information while it does not need any training step, which may be sensitive to training samples. Experiments on one public face database and one palm print database show the effectiveness of the proposed method.

### III RESULTS AND DISCUSSION

LBP was originally proposed as a texture descriptor. It owns many advantages, such as it is simple to implement and fast to compute. It has been validated that uniform patterns play an important role in texture classification. Uniform patterns also showed its superiority in face and palm print recognition. Incorporating uniform idea, many patterns, which are not “uniform” patterns, are clustered into one “non-uniform” pattern. And, the percentage of “non-uniform” patterns increases as the radius increases, so much information is lost. Recently, some works were proposed to address this issue. Many “non-uniform” patterns are isolated from the “non-uniform” cluster. However, such methods are learning based algorithms, which require some training samples to discover useful “non-uniform” patterns.

### IV CONCLUSION

In this project, a fast face recognition system is implemented. A Local gradient patterns (LGP) and binary histograms of oriented gradients (BHOG) algorithm is used to determine the location of the face in the image. Then the scanned images are checked with our database images and perform security to the office. This application provides a better security in office or home application. The face detection is for providing office security. Office members list are stored in the database. Whenever the persons are coming inside of office, they are scanned using our application. Then the scanned image is checked with our database images. If does not matched means, it will indicate some alerts. This application provides a better security in office/home application. Our proposed system can only handle frontal

and near frontal faces. In order to deal with multi-view faces, more relative work must be done. Second, in the face detection part, according to our needs, we only detect the biggest face in the picture, which limits the application of our system. Therefore, in the further development, we will try to recognize more than one face in the picture.

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