

# An Efficient Method for Identification of Faces for 2D Images

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**Abstract**— The experiment is one of the rare biometric methods that possess the merits of both high and low accuracy. It has the accuracy of a physiological approach without being intrusive. This paper involves face detection, feature removal from the face region, identification or conformation. Face identification systems executes systematically analyzing specific features that are common to each and every face, the distance between the eyes, width of the situation of cheekbones, jaw line, chin, etc.,. These numerical quantities are then combined in a single code that uniquely identifies each person. There are a number of benefits to this technology. Nowadays many issues arise like password verification (people write them down, they ignore them, they make up easy-to-hack passwords). Our efficient method of facial identification can be done very rapidly and uniformly, with a minimal training. And this identity can be verified without resort to documents includes remove, missing or adjusted.

**Keyword-** Image processing, Filter Techniques, Histogram, Segmentation, Feature Extraction, Database, Pattern Matching.

## I. INTRODUCTION

Nowadays, the crimes of credit card fraud, computer break-in by hackers, or security breaches in a company government building has become common. Recently, technology became available to allow verification of "true" individual identity [8] named as "biometrics". Biometric access controls the automated methods of living person on the basis of some physiological characteristics. One such method is face identification which is a both challenging and an important recognition technique. Among all the biometric proficiency, face identification approach [9] possesses one great advantage, which is its user-friendliness. Matlab has been used to produce simulated results for numerical computations with matrices and vectors. The tool makes the operations easier to perform using built in functions [7]. The below section deals with the description of entire processing which has to be carried out in essence of face recognition.

In today's networking world, the need to maintain the security of information or physical property is becoming both increasingly important and hard.

## II. METHODOLOGY

The block diagram 1 deals with the image can be given as an input from the user in the form of JPEG file format. The image acquired should be converted into gray scale of the same size to that of the image present in the database. The image is then preprocessed, that is smoothing is done where average filters are used. The histogram equalization is done for obtaining the uniform histogram for the output image. To get the abstract representation of the input, segmentation is carried out. The relevant features are extracted from the segmented image and pattern matching is done for the extracted image to that of the image in the database using LDA (Linear Discriminant Analysis) algorithm. This paper deals with the mathematical methods for pattern matching as discussed below:-

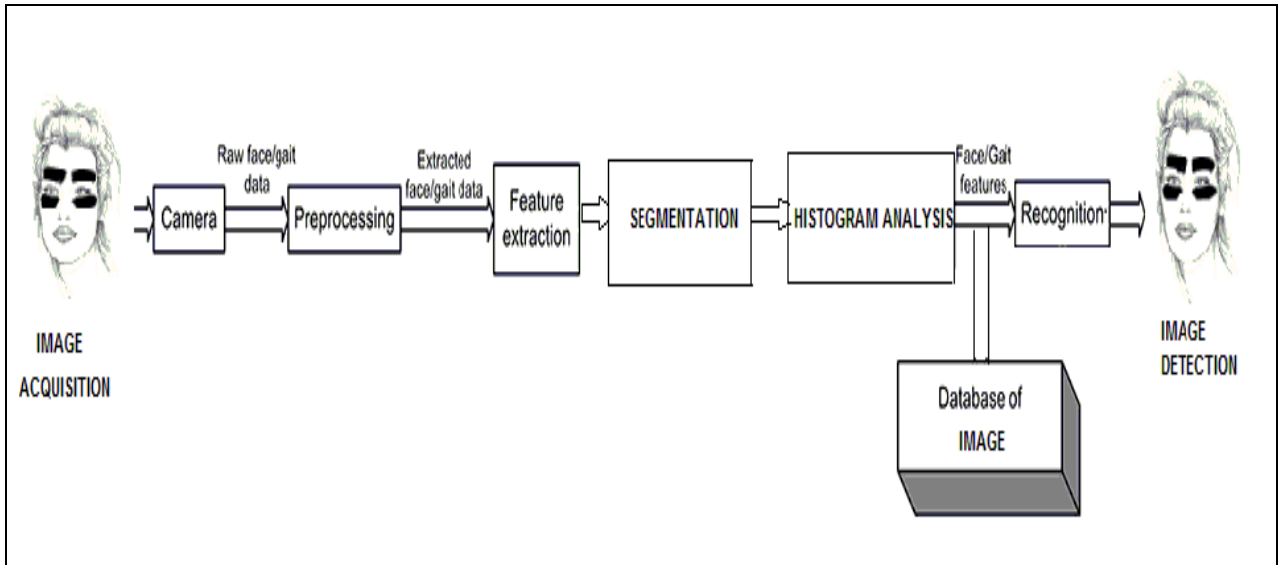


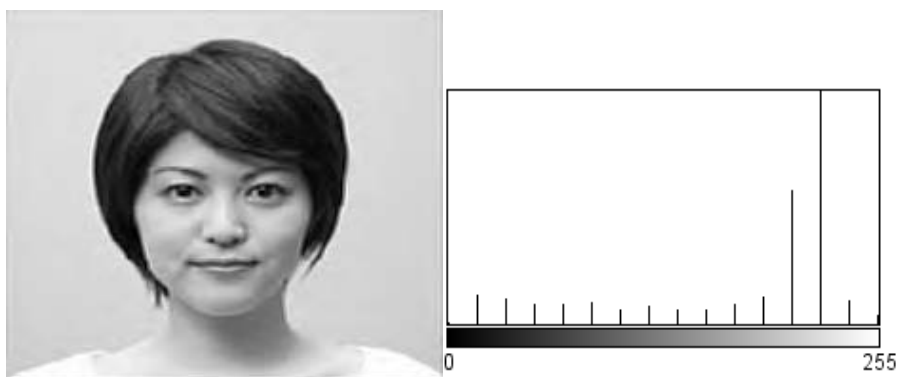
Fig 1: Block Diagram of Face Identification

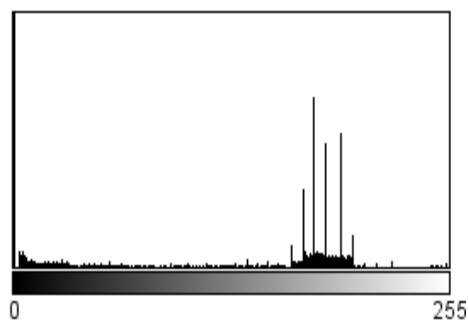
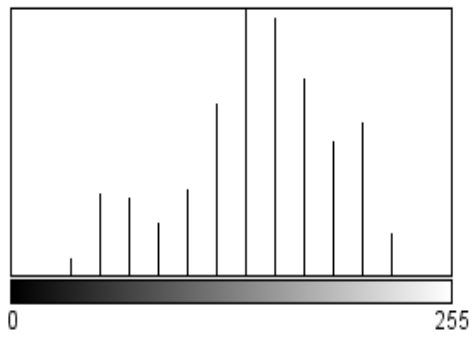
The figure 1: block diagram of efficient method for face identification deals with the 2d images as an input image. The distortions should be removed using preprocessing techniques. The enhanced image should be given for extracting features like mathematical moments necessary for segmentation. The segmented image should be analyzed using histogram technique. Finally, if the histogram of the acquired image is similar to that of the database histogram image, the image will be detected/recognized.

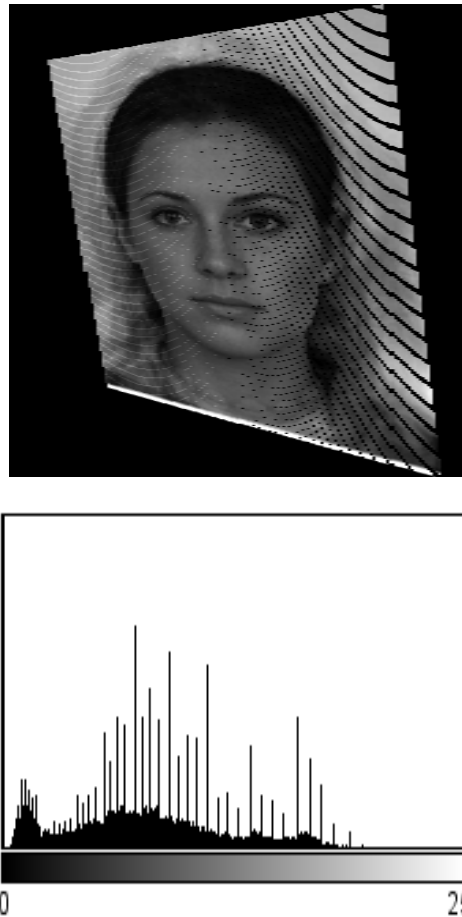


Fig 2: Face recognition in various resolution

The figure 2 discuss with the recognition of faces in different resolutions have been stored in the database for purpose of matching the face identification.







The various views of images of normal image and 2d image and their respective histogram analysis have been dealt in figure 3 (a) (b).

### IMAGE IDENTIFICATION

An image should be identified by acquiring through camera. And the format of the image is should be in JPEG- file format [8].

### PRE PROCESSING

Preprocessing is carried for various reasons. Preprocessing is done for gray scale image which will enhance the recognition performance in the mentioned variations [5]. Have to protect the edges from blurring while smoothing a directional average filters for better enhancement. One of the filter for better enhancement can be median.

Median Filter is used an one of the nonlinear filtering methods that can be used to remove noise from an image which becomes as a processing step to carry out for the further phases. And it stores edges by removing noise and hence enhancing the image. Noise can be in the form of bright pixels or dark pixels with uneven distribution of pixels in the image. Noise can affect the image with the filter based on two aspects of the spatial extent of the neighborhood and the pixels going to take part in the computation

### HISTOGRAM ANALYSIS

Let the variable 'r' represent the gray levels of the image to be enhanced. We assume that 'r' has been normalised to the interval [0, 1], with r = 0 representing black and r = 1 representing white.

Later, we consider a discrete formulation and allow pixel values to be in the interval [0, L-1] where L is the highest gray level value.

For any r satisfying the aforementioned conditions, we focus attention on transformations of the form

$$s = T(r) \quad 0 \leq r \leq 1 \quad \dots \dots \dots (1)$$

The goal of histogram equalization is to obtain a uniform histogram for the output image. The histogram of an image represents the relative frequency of various gray levels in the image.[12]

### SEGMENTATION

This technique divides the image into meaningful parts or regions. The edge and line detection approaches are used to segment the meaningful parts or regions. The complete face will be segmented from that of the background [1][2].

### FEATURES EXTRACTION

One of the prerequisites of identification and recognition of the image is Feature extraction. By the term feature separation, we mean deciding various attributes as well as properties associated with a region or object [15]. The objective of feature selection and extraction technique is to reduce the dimensionality. The LDA (Linear Discriminant Analysis) algorithm has been suggested for dimensionality reduction [4]. LDA algorithm offers many advantages in other pattern recognition tasks, and we would like to make use of these features with respect to face recognition as well. During this process, only salient features necessary for recognition are retained. The nose part is extracted[1][2][3]. In this paper, mathematical techniques have been extracted for image interpretation as given in the table nos.1 & 2.

| Original Image | Mean   | Standard Deviation |
|----------------|--------|--------------------|
| Normal Image-2 | 142.65 | 44.106             |
| 2D Image-2     | 30.384 | 49.099             |

Table No. 1 Mathematical methods of normal image and 2d image 1

| Original Image | Mean    | Standard Deviation |
|----------------|---------|--------------------|
| Normal Image-1 | 174.108 | 67.85              |
| 2D Image-1     | 46.533  | 76.68              |

Table No. 2 Mathematical methods of normal image and 2d image

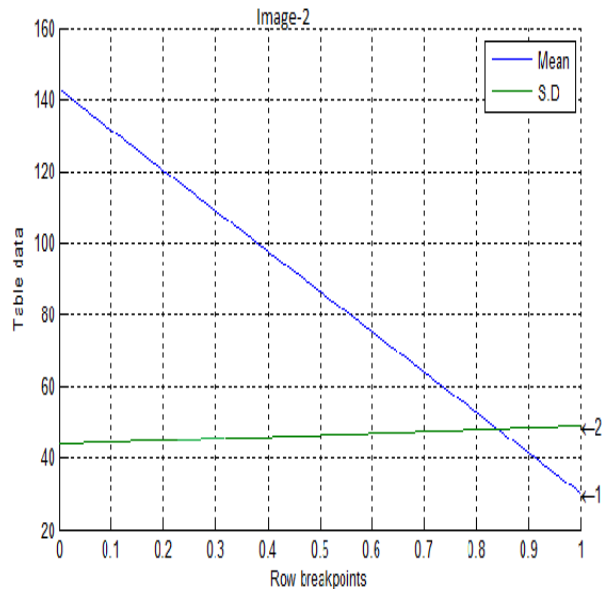
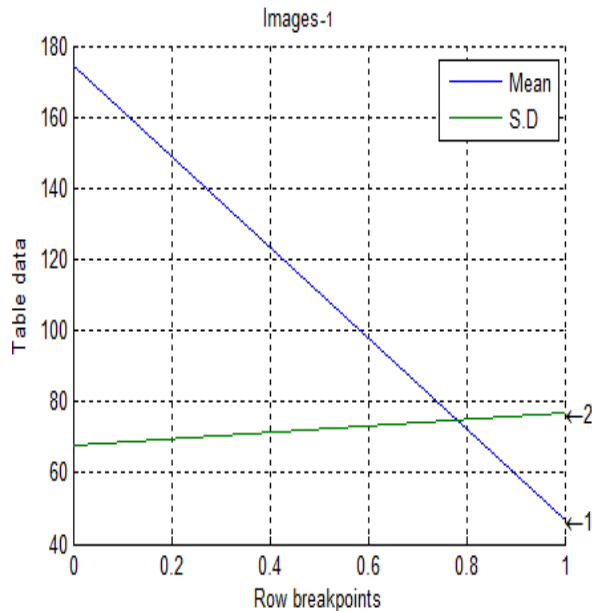


Fig. 4: Graphical representation of mathematical methods for Image – Fig. 5:Graphical representation of mathematical methods for Image

This figure deals with the graphical representation of mathematical methods of mean and standard deviation

### PATTERN MATCHING

Comparing is carried out with the template generated in feature extraction of mathematical methods with those in a database of known faces. In an analyzing application, this process yields scores that identify how closely the generated template matches each of those in the database. In a conformation application, the generated template is only compared with one template [14] in the Microsoft access database – that of the claimed identity [3]. The selection of uniform and symmetrical patterns can be carried out by applying the pattern matching only for these specific patterns that are stored in database. The values got from the input image are compared with database values using MATLAB[7].

### III.CONCLUSION

Face recognition is a challenging and important realization technique. Among all the biometric techniques, face recognition way possesses one great advantage, which is its user-friendliness. In this paper, we have given the steps involved in face recognition which are face acquisition, face feature extraction from the face region, recognition or verification. We have covered issues such as the way the face image is acquired for face

rectification, methods/factors that may affect the efficiency of the recognizer, and so on. We hope this paper can provide the readers a better understanding about face recognition.

#### IV.FUTURE WORK

This paper covers the different modules which is required prior to face recognition. The paper can be improved in making more precise recognition. Different modules can be improved in ways such as-Image Selection: The selection of image can be improved by not restricting it to jpeg format but taking image of different types like bmp, gif, tif etc. Feature extraction: This can be improved to extract different features rather than just few features of the faces and the extraction can be done automatically rather manually. Pattern matching: This can be done in wider way by storing multiple views of a face of gray scale images.

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