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A Quadra –Techniques for Face Recognization through OZMN

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ABSTRACT - This paper representing a facial recognition technique ona different set of data. Each image has its unique features and each feature extracted through numerical values. To distinguish different images this paper is focused on four different operations, such as; data collection, preprocessing, feature extraction, identification and classification. The technique has been implemented on different types of images, by using Otsu method for segmentation, zero crossing for edge detection, neural network for identification and classification, which gives the maximum accuracy of 99.8% of resultant values.

KEYWORDS: Data of input face image,Preprocessing,Segmentation, Feature extraction,Classification**.**

I. INTRODUCTION

The world is running completely on the computer and the functionality of a system is becoming more efficient. All the security identification, analysis and classification are done the system, in such security system face is an important part of the human being. Face represent complex, multidimensional, meaningful visual stimuli and developing a computational model for face recognition is difficult [1]. The Face recognition application is one of the emerging application, its mainly applicable to access control for a system which is done by giving face at a password security system to provide security surveillance application to track persons, many other applications where identification is needed.

Face recognition is an important research area which spans numerous field disciplines. Not only the computer science research, but also the psychologists, neuroscientists and criminologists are involved in this area of research. This recognition technique is practically applied in many areas such as, bank account holder's identification, access control units of industry, defense, mug shots searching and security monitoring and surveillance system. It is not only used for security system, but also to build good rapport with a society which helps for effective communications and interactions among people.

II. LITRATURE SURVEY

In recent years,Face recognition has received significant attention Zhao et. Al. Has proposed this work in his paper in the year 2003 and Jain et. Al. Developed a model in the year of 2004. It plays an important role in many applications such as human-machine interpretation authentication and surveillance. The wide range variations of human face due to pose, illumination and expression result in a highly complex distribution and deteriorate the recognition performance [3]. In addition to this, the problem of machine recognition of human faces continues to attract researchers from many disciplines such as image processing, pattern recognition, neural networks, computer vision, computer graphics and psychology [7]. The problem in machine recognition of faces can be formulated as follows, given still images of human to identify one or more persons in the image using stored in databases of faces. To perform this certain feature have to be considered while developing this face recognition system such as illumination, face, hair, makeup, head poses and facial expression [3]. These features may not give much accuracy of recognition of faces because if a person changes

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his makeup or facial expression or some artificial factors then the system will fail to recognize. This reduces the accuracy of recognition.

III. METHODOLOGY

Figure 1 shows the flow of analysis and identification of face recognition systems.

1. Face Image Data collection: The input image can be collected generally from a video camera or still camera or surveillance camera. This collected image need to be stored in a file or input database so that it will be further used for future steps. IF the number of input image is more, then it is easy to identify the accuracy of the system.

2. Preprocessing of input image to remove noise: Digital image obtained from scanning may contain some amount of noise depending upon the quality of scanner and source of image during the time of capturing images, there is a possibility of distraction due to the natural effects like mist, sunshine, motion effect or due to technical effects such as rotation, scaling, shift translation, intensity of image etc. may be present in the face image, so it may difficult to identify the face of a person, to make this system to work efficiently with maximum accuracy this preprocessing step is very important. In this preprocessing step it removes any unwanted objects or noise present in the image. It also segment the face image feature from background features. To carry out these things, certain specific operations is implemented.

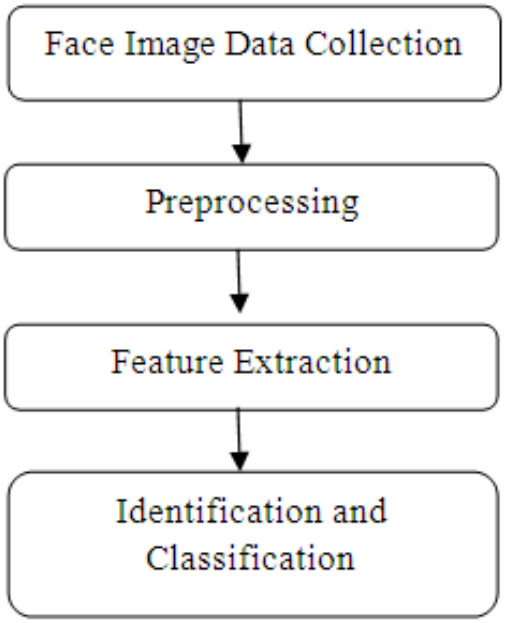

Figure 1: Flow of face recognition system

2.1. Image segmentation using Ostu method: The input image of the face is maximum of the color image, hence the color image is going to act as input data, this technique will convert this color image into binary 0 or 1 bit image to perform this operation, the Otsu's method is used to automatically perform clustering based image thresholding or reduction of a gray level image to a binary image. In Otsu's method we exhaustively search for the threshold that minimizes the intra class variance, defined as a weighted sum of variances of two classes, this method produces a threshold on the 0.1 scale. This method of threshold applies to the dynamic range of pixel intensities present in the

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image this method will segment input image of person with background data. The following algorithm is used to carry out this operation.

1. An input color image which holds person face along with background details.
2. The color input image is first converted into gray scale image.
3. Compute histogram and probability of each intensity level.
4. To fix the thresholding setup initial weight $\omega_i$are the probability of two classes separated by threshold t and σ_i^2 are variances of these classes and class mean isμ_i, for basic initialization set $\omega_i(0)$ and $\mu_i(0)$.
5. Set up the possible thresholds t=1.. Maximum intensity
   1.Update weight $\omega_i$and mean μ_i.
2. Compute $\sigma_i^{2(t)}$ is the intra-class variance calculated with a weighted sum of variance of two classes.

$$\sigma_w^2(t) = \omega_1(t)\sigma_1^2(t) + \omega_2(t)\sigma_2^2(t)$$

Otsu shows that minimizing the intra-class variance in the same as maximizing inter-class variance

$$\sigma_b^2(t) = \sigma^2 - \sigma_w^2(t) = \omega_1(t)\omega_2(t)\left[\mu_1(t) - \mu_2(t)\right]^2$$

The class probability $\omega_1(t)$ is computed from the histogram t. $\omega_1(t) = \Sigma_0^t p(i)$

While the class mean $\mu_1(t)$ is

$$\mu_1(t) = \left[\Sigma_0^t p(i)\, x(i)\right] / \omega_1$$

6. Desired threshold correspond to the input image will be fixed by using $\sigma_b^2(t)$.
7. Compute to maxima and corresponding threshold $\sigma_{b1}^2(t)$ is the greater mass and σ_{b2}^2 (t) is greater or equal maximal.

This algorithm will show the resultant image which is segmented or extracted from a background or noise data. This resultant area of the image is also known area of interest.

2.2. Edge Detection: The previous resultant image is the input for this step, now edges of an interested area have been extracted by using the zero crossing technique. This is a mathematical process aim at identifying points in digital image at which the image brightness changes sharply or more formally, has discontinuities. The point at which image brightness changes sharply are typically organized into a set of curved line segments termed as edges. This process is performed by the zero crossing method. In this a point where the sign of the mathematical function changes, represented by crossing of the axis zero value in the graph function. The mathematical representation of zero crossing edge detection, $d^2f(x)/dx^2=0$. The output of this process is a series of edge counter. These edges may contain a series of valid and invalid edges, for this implementation purpose, only valid edges are extracted for feature extraction. The small noise edges of are removed by using morphological operations with the help of structural elements.

2.3. Feature Extraction: The valid edges of preprocessing method will be the input for feature extraction, in this step the preprocessed image is resized to generate standard size of image, for this we have standardized the preprocessed image to 400X400 pixel holding the values of 0 & 1 binary bit. These pixels will be converted into blocks, here each individual block is holding 100X100 pixel values. The total number of blocks created are 16 with 4X4 matrix form. Once blocks are generated, thenthe mean value of the each block is calculated, this mean values are not in binary bit representation, it holds the numerical values, hence 16 different mean values are generated for entire preprocessed image, these mean values are itself acting as a feature of this face reorganization system.

2.4. Identification and classification: This identification and classification model is developed with neural network implementation, in these two arrays are playing very important role that is input array and target array. The neural network consists of an input layer with n number of input neurons and output layer will generate only one actual output value, in between these two layers hidden layers are present. The input neuron signal is multiplied with each individual weight value and all the values are summed at the resultant output layer. In this experiment the mean values of each block that are 16 different mean values are present in input array and after undergoing all the neural network operation, it will generate actual output, this actual output will be compared with a target output if both are same then it will show the statement has performance goal met.

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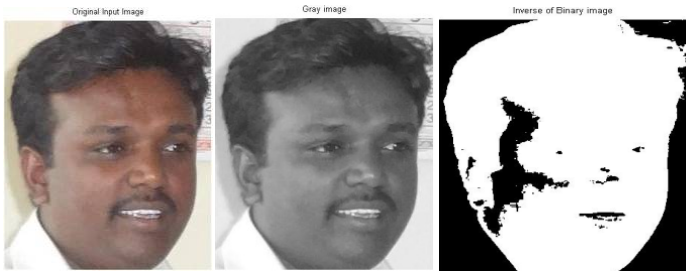
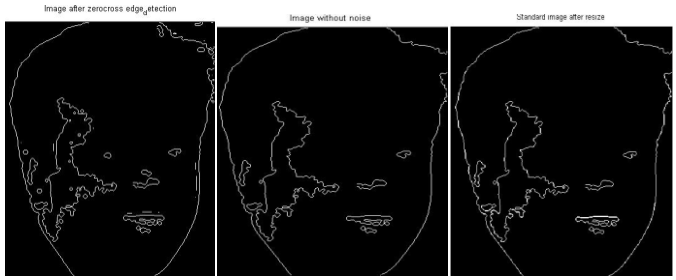
IV. EXPERIMENTAL RESULTS

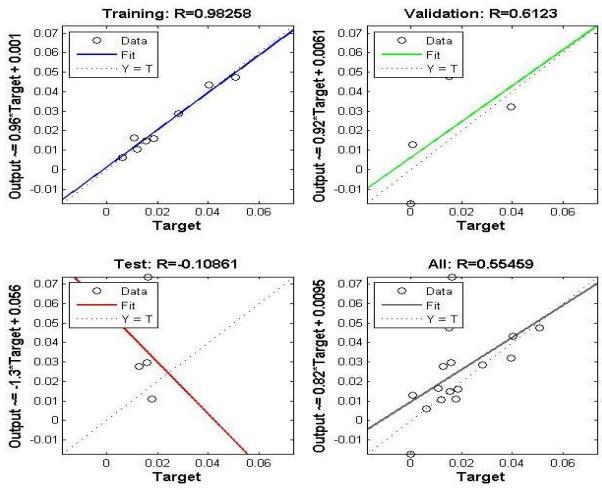
The steps which has been discussed in above part has been implemented and relevant resultant output is represented in this part.Figure 2 represent different stages of output, a is original image, b is gray scale image, c is binary image extracted by Otsu method, d is edge detection through zero crossing, e is the interested long curve extracted from previous image, f is the standard sized image which can be further used for feature extraction by calculating mean values of each blocks these features will be sent to neural network for identification and classification, g is the resultant graph plot of neural network implementation.



(a) (b) (c)



(d) (e) (f)



(g)

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V. CONCLUSION

The overall methodology and implementation is giving maximum accuracy comparably with other technique such as SVM, K-NN methods of identification and classification. This implementation is producing the output of 99.8% accuracy.

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BIOGRAPHY

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