International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169
Volume: 5 Issue: 4 543 - 545

Detection Of Feature In A Face Image Using Digital Image Processing Using Matlab

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Abstract: In the paper, an enhanced a daboost algorithm is suggested for enhancement of performance of system. In this algorithm, the eigenvectors are computed for the facial space & classification is implemented. In the classification, we underwent the process of learning for training & testing. On that basis, the facial expressions are identified. As from the outcomes of session in base paper, the outcomes are obtained from reboost detection. The outcomes are provided for false alarm rate & Detection rate. The suggested methodology is implemented & performance for detection rate is also improvised for false alarm rate also. The rte of detection is also enhanced & false alarm rate is minimized. For presenting the contrast, a GUI window is presented in which the contrast is displayed.

Keyword: - Adaboost , Reboost face detection , False Alarm Rate(FAR), Detection Ratio(DR).

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I-INTRODUCTION

A facial recognition system is computer software developed particularly for the recognition & verification of a person from a digitized picture from source of video. One method to do this is by making comparison in choosing facial attributes from an image & facial database.

It is generally implemented in security systems & can be put in contrast to other relative biometrics systems like fingerprints or iris identification systems [1].

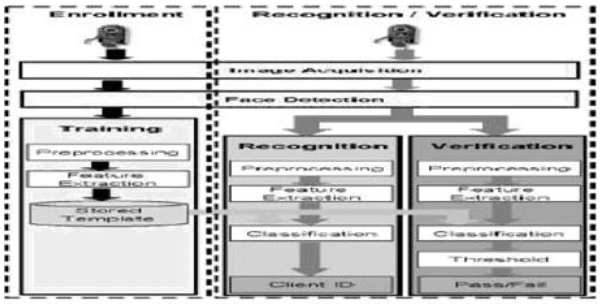


Figure 1- Face Recognition System Block Diagram [12]

II-PRINCIPAL OF ALGORITHM

A 2-Dimensional faciam image having size of N*N in a training group is presented as column vector of N^2 size. It is presumed that M pictures are considered. They are presented as P_1, P_2, P_3 ……PM .

An aggregated face image is computed as $m = \frac{1}{M}\sum_{1=1}^{M} P_i$.....(1)

Further, mean centered pictures are attained by subtraction of mean image from every image vector & it can be explained as $\psi_i = P_i - m$ .....(2)

The matrix A defines the set of all mean-centered images

$A = [\psi 1, \psi 2, \psi 3 \ldots\ldots\ldots \psi M]$ .....(3)

$C = AA^T$ leads to forming of a covariance matrix with dimensions as $N^2 * N^2$ & formulating N eigenvectors & eigen values is a very tough job for a peculiar size of image. In order to make it

simple, $C = A^TA$ value is computed that would be a matrix of small size of M * M & will reuire less computations.

The eigenvector V_i of A^TA is taken into consideration so

$$A^T A X_i = \lambda_i X_i \quad \text{.....(4)}$$

By multiplication of the given equation with A on the both of the sides

$$AA^T AX_i = A(\lambda_i X_i)$$

$$AA^T(AX_i) = \lambda_i(AX_i) \quad \text{.....(5)}$$

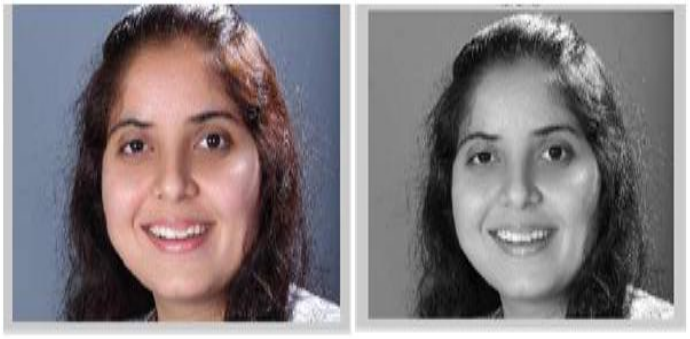
$\acute{\omega}_k = U^T (P_k - m)$, k = 1,2,....M .....(6)

in which $(P_k - m)$ describes mean-centered image. In this every picture can be projected by making use of above given equation, as $\acute{\omega}_1$ for initial image, $\acute{\omega}_2$ for the succeeding image & further more.

III-ENHANCE ADABOOST ALGORITHM

Step 1:- The image scale is converted to Gray scale image.

The input image for the test facial expression is provided which is then transformed to Gray scale image.



a) Original Image (b) Gray Scale Image

Fig 2 :- Conversion of original image into Gray scale image

Step 2 :- Transformation of image to binary image.

In the 2nd step, we will transform the image to binary matrix in order to produce graphs & the images can be compared to obtain facial expressions from them.

Step 3:- Implementation of binary labeling & computing characteristics of image portions.

As the image is transformed to binary form, the values are obtained from binary system. A matrix from image binary number is generated. From this binary information, we contrast the characteristics of image in order to attain expressions from the picture.

RESULTS

In this paper the methodologies for face recognitions & the comprisons for enhanced ada boost along with reboost detction algorithm is presented. Here the outcomes wil be presente as detection ratio & false alarm rate

TABLE 1: - SMILE DETECTION RESULTS COMPARISON

ALGORITHM	DETECTION RATIO	FALSE ALARM RATE
Reboost detection	1.3404	0.9747
Enhanced Adaboost Detection	2.1137	0.3780

Fig 3: - Smile Face expression detection

CONCLUSION

Advancement in power of computer processing & latest algorithms provide some new means for envisioning Human Computer Interaction. A computer is able give appropriate responses to the affective state of user by help of automated emotion identifier instead of simply giving responses to commands made by user.

We tend to improvise the facial expressions identification process. The enhance adaboost algorithm is implemented for enhancing the performance. It s also observed from the outcomes that false alarm rate & detection ration gets enhanced by the algorithm. The detection ration for facial expressions is being enhanced by around 60% & false alarm rate is minimized by 40% from enhance adaboost algorithm.

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