

An ESSAM Transform for Face Recognition

Essam Haider Mageed

Computer science department
Faculty of computer science and
mathematics

University of Kufa.

essamh.almosawee@student.uokufs.edu.iq

Professor.Hind Rostom Mohmmmed Shaban

Computer science department Faculty
of computer science and mathematics
University of Kufa

hindrustum.shaaban@uokufa.edu.iq

Abstract: *These pagers will introduce a new conversion to distinguish this conversion leads to be discrimination to faces in a new way and like any method for each conversion there are properties to be drawn and selected from the main law of conversion and the conversion of five properties ready for selection and demodulation to be at the same time draw and chose this as the rest of the other transfers forgot it discrimination for this conversion reaches 99%.*

Keywords: -E_transform, features_extraction_selection , face classification, face recognition.

Introduction

Confront acknowledgment has dependably been an exceptionally difficult assignment for the explores. From one perspective, its applications might be extremely helpful for individual confirmation and acknowledgment. Then again, it has dependably been exceptionally hard to actualize because of all extraordinary circumstance that a human face can be found. By the by, the methodologies of the most recent decades have been deciding for face acknowledgment improvement. Because of the trouble of the face acknowledgment

undertaking, the quantity of strategies is extensive and differing. sitting by using face recognition technology. It is also possible to know whether students are awake or sleeping and whether students are interested or bored in lecture if face images are annotated with the students' name, the time and the place[2].

E_transform

This transform 2D its name according to(Essam) for face recognition I introduced new transform with five features for extraction and selection in same time ,this transform leads to be a good transform only for face recognition :-

$$E_{transform(e1,e2)} = \sum_{i=1}^{e1} \sum_{j=1}^{e2} Jf(i,j)$$

(1).

Where $J=(E_s+S_s)/2$.

$$E_s = \sum_{i=1}^{e1} \sum_{j=1}^{e2} f(i,j) / \max|f(i,j)|$$

(2)

$$S_s = \sum_{i=1}^{e1} \sum_{j=1}^{e2} \frac{f(i,j)}{\min|f(i,j)|+1} (3)$$

Features_extraction_selection

Proposed features is for extraction and selection in same time so this leads to good thing in time , because (extraction and selection) in same time , values of these features in(figure(1)) and these features are:-

E1=

$$select\ first\ value\ row | \sum \sum E_{(e1,e2)} | \cdot \sum_{i=1}^{col} mean(f(i))$$

(4)

E2=

$$select\ last\ value\ row | \sum \sum E_{(e1,e2)} | \cdot \sum_{i=1}^{row} mean(f(i))$$

(5)

E3=

$$select\ first\ value\ column | \sum \sum E_{(e1,e2)} | \cdot \sum_{i=1}^{col} std(f(i))$$

(6)

E4=

$$select\ last\ value\ column | \sum \sum E_{(e1,e2)} | \cdot \sum_{i=1}^{row} std(f(i))$$

(7)

E5=select as

(Five_feature_algorithm).

Five_feature_algorithm

$X = \text{size}(E_{\text{transform}(e1,e2)})$ of row

If $X \% 2 == 0$

$$E6 = E_{\text{transform}(e1,e2)} \left(\frac{x}{2}, \frac{x}{2} \right)$$

$$E7 = E_{\text{transform}(e1,e2)} \left(\frac{x}{2} + 1, \frac{x}{2} + 1 \right)$$

$$E8 = E_{\text{transform}(e1,e2)} \left(\frac{x}{2}, \frac{x}{2} + 1 \right)$$

$$E9 = E_{\text{transform}(e1,e2)} \left(\frac{x}{2} + 1, \frac{x}{2} \right)$$

$$E5 = ((E6 + E7 + E8 + E9)) / ($$

$$\sum_{i=1}^{\text{row}} \sum_{j=1}^{\text{col}} \text{std}(f(i,j))$$

Else

$$E5 = ((X / 2) + 0.5) / ($$

$$\sum_{i=1}^{\text{row}} \sum_{j=1}^{\text{col}} \text{std}(f(i,j))$$

Endif

Transform_mean = $(E1 + E2 + E3 + E4 + E5) / 5$ % mean of features from new transform as single value.

(8)

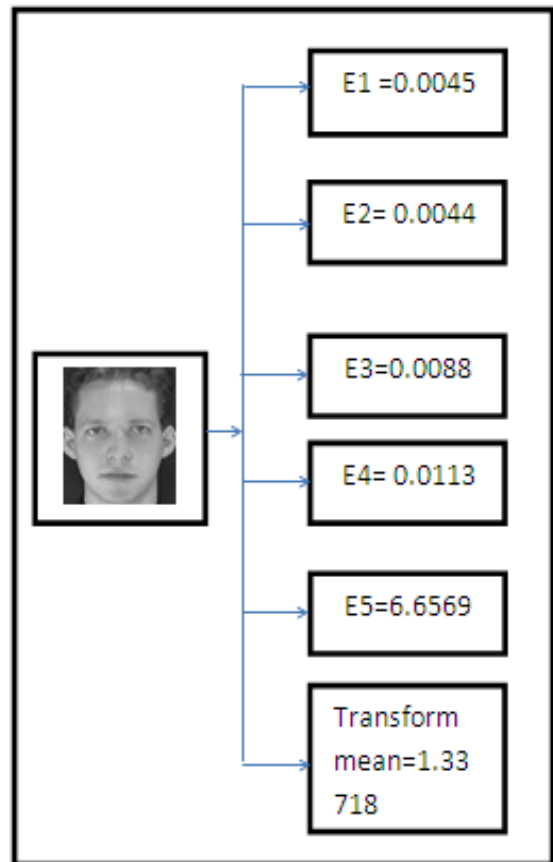


Figure (1):-values of features to new transform.

Proposed system

I apply new transform(2D) for image and then take the five features for result from transformation and then find mean for these features to become one value for each image, for face classification use Manhattan distance and for face recognition using minimum distance.

Algorithm of proposed system

Step1:-Read images database in one loop .

Step2:-Convert (step1)to grayscale and then to double.

Step3:-Apply new transform in (1).

Step4:-Extract features(E1,E2,E3,E4,E5).

Step5:-Find mean to(step4)and then end loop .

Step6:According to databases (there are persons and poses), to save result according to database , take (re_shape of (step5)), put in form(10,40) and

then take (10,40)' to become (40*10) according to persons and poses .

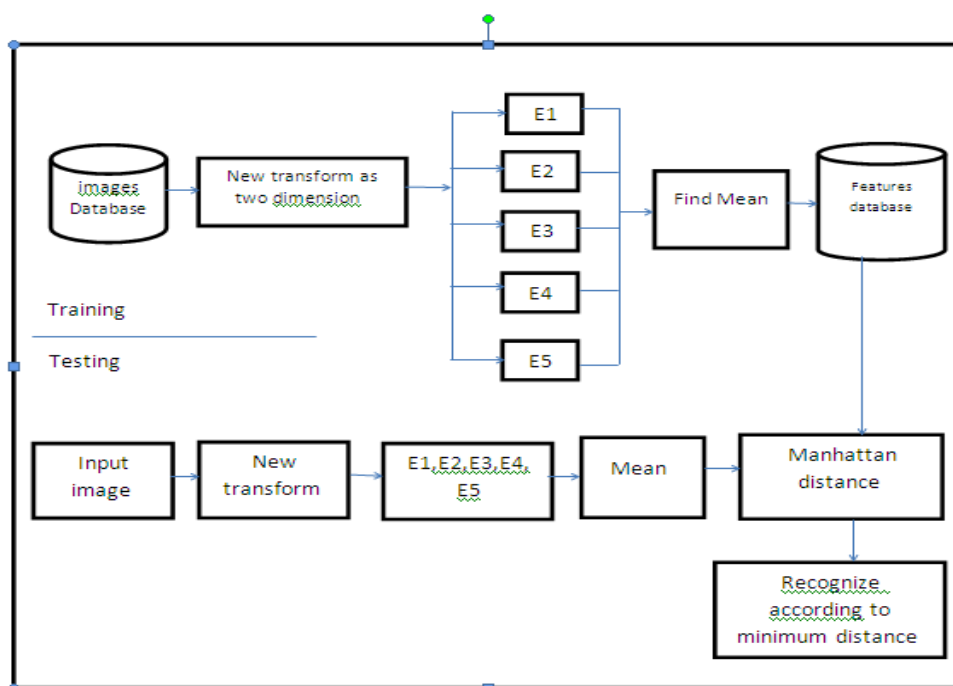
Step7:-Read image to be test it convert (step1)to grayscale and then to double.

Step8:- Apply new transform in (1).

Step9:-Extract features(E1,E2,E3,E4,E5) ,and take mean .

Step10:-Apply Manhattan distance between (step6 and step9).

Step11:-Find person of minimum distance (is recognize person).



End of algorithm.

Figure (2):-Training and Testing

The analysis of new system

This new system when I compare with another system the error rate less than the others ,face recognition rate greater than others, in (table1) show error rate of another methods and proposed system ,in (table2) show recognition rate also between my system and previous methods , to see all the content of proposed

methods and new system (see figure(2)).

$$\text{performance} = \frac{\text{number of false image}}{\text{totla number image}} \quad (9)$$

To compare time complexity of new transform with (Fourier transform) in table(3).

Conclusion

Table(1):-false rate to new method and another methods.

Algorithm	False
Anthroface3D	1.65
ACFFR	1.64
New method	0.66

Table(2):-The rat of recognition to new method and another methods.

Algorithm	False
Anthroface_3D	97.3
A_C_F_F_R	97.5
New method	99

Table(3):Time complexity of new transform and Fourier transform.

Transform	Run time
Fourier transform	0.469691 seconds
Essam transform	0.013257seconds.

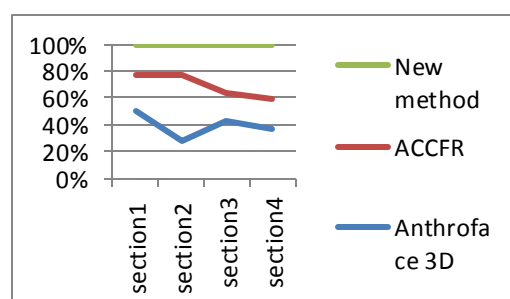


Figure (3):-Curve of new system.

Using (new transform and five features), and Manhattan distance for classification will increase recognition rate and the new transform is new and task is very important for face recognition, I expected this new transform will be very important not only in face recognition but in image processing for another task, so may be another researcher of students they are used this transformation will be useful. Finally the recognition according to my new transformation is 99%, the advantage in of new system features , there is one feature very important in face recognition according to this system is E5 , this feature take the location in center of face , so when I need to recognize face , this

factor(feature) leads to be difference between each images and the same for person poses itself, the power of this system is in the E5 new features(E1,E2,E3,E4,E5) are five stars for new transform.

Reference

[1]ECE533 - Image Processing Project, Face Recognition Techniques, Jorge Orts.

[2] Face Recognition-based Lecture Attendance System, Department of Intelligence Science and Technology, Graduate School of Informatics, Kyoto University
Academic Center for Computing and Media Studies, Kyoto University.