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IMPLEMENTATION OF 3D BIOMETRIC IN RECOGNITION SYSTEM

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ABSTRACT: Palm print recognition is one of biometrics available at present. Biometric systems are used to authenticate identity by measuring physiological and/or behavioral characteristics. So, two main categories of biometrics are 'physiological' and/or 'behavioral'. physiological category includes physical human traits such as palm print, veins, etc. behavioral category includes movement of human, such as hand gesture, speaking style, signature etc. measurement of these traits helps in authentication using biometric systems. palm print based systems for evidence make use of ink marking to capture palm print patterns. These systems are not greatly accepted because of biget attention & co-operation of users to provide data. Recently digital camera is used to capture images & users hand placing is constrained using pegs.

[1] INTRODUCTION

Biometrics is technology of identifying special human subjects by means of measuring & analyzing one or more inherent behavioral or physical traits. These human body feature include fingerprints, voice patterns, eye retinas & irises, facial patterns & hand dimension. System of Biometric are include applications making use of biometric technologies & which allow identification automatically. In principle, processing of personal data involving use of a system of biometric is considered by privacy experts to be only justified within places requiring a high level of security & absolute identification procedures.

Palm print recognition is one of biometrics available at present. Biometric systems are used to authenticate identity by measuring physiological and/or behavioral characteristics. So, two main categories of biometrics are 'physiological' and/or 'behavioral'. physiological includes category physical human traits such as palm print, hand shape, eyes, veins, etc. behavioral category includes movement of human, such as hand gesture, speaking style, signature etc. measurement of these traits helps within authentication using biometric systems. One of most successful biometric systems is palm print recognition system. This system recognizes on basis of palm print of a person. It is reliable due to fact that print patterns are always unique. Palm print is made up of principal lines, wrinkles, & ridges. Three kind of features are within palm print: geometry features (width, length, & area of palm), line features (principal lines, coarse wrinkles, & fine wrinkles), & point features. Palm print verification uses these features to verify identity of a person.

Uniqueness Of Biometric Features

Table shows cross accuracy of different biometrics.

Biometrics	*Crossover Accuracy*
Retinal Scan	1:10,000,000+
Iris Scan	1:131,000
Fingerprints	1:500
Hand Geometry	1:500
Signature Dynamics	1:50
Voice Dynamics	1:50

Table 1: Comparison of Biometrics Techniques [Ruggles,1998]

[2] LITERATURE REVIEW

During 1858, first recorded systematic capture of hand & finger images for unique purposes was used by Sir William Herschel,

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Civil Services of India, who acquired a handprint on back of a contract for each worker to discriminate recruits (Komarinski, 2004).

During 1870, Alphonse Bertillon developed a method of identifying individuals based on comprehensive records of their body dimensions, physical descriptions & photographs. This approach was termed as "Bertillonage" or anthropometrics & usage was aborted within 1903 when it was discovered that people share same measurements & physical characteristics (State University of New York at Canton, 2003). Sir Francis Galton, within 1892, developed a taxonomy system.

Drs. Leonard Flom & Aran Safir, within 1985, found out that no two irises are alike & their findings were awarded a patent during 1986. In year 1988, first semi-automated facial recognition was deployed by Lakewood Division under Los Angeles Country Sheriff's section for recognizing suspects (Angela, 2009). This was followed by several pioneering contribution by Sirovich & Kirby (1989), Turk & Pentland (1991), Philipis et al.(2000) within field of face recognition

[3] TOOLS & TECHNOLOGY

Voice Print - Voice recognition is very different to speech recognition. Speech recognition detect words & sentences from an incoming audio signal whereas voice recognition tries to detect speaker given a voice sample. But as each & every person has got different voice pattern that's why no two voice prints are matched.

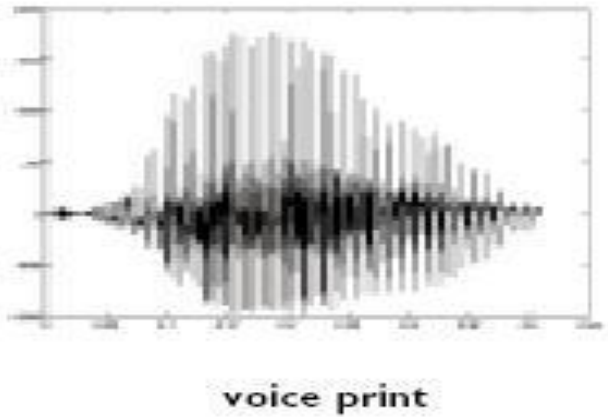

Fig. 1: Voice Print

Canny Edge Detection

John Canny considered mathematical problem of deriving an optimal smoothing filter given criteria of detection, localization & minimizing multiple responses to a single edge. He showed that optimal filter given these assumptions is a sum of four rapidly growing terms.

He also showed that this filter could be well approximated by first-order unoriginal of Gaussians. Canny also introduced notion of non-maximum suppression, which means that given presmoothing filters, edge points are as points where gradient magnitude assumes a local maximum within gradient direction.

Looking for zero crossing of 2nd derivative along gradient direction was first proposed by Haralick.[9] It took less than two decades to find a modern geometry variational meaning for that operator that links it to Marr–Hildreth (zero crossing of Laplacian) edge detector. That observation was presented by Ron Kimmel & Alfred Bruckstein.

[4] PROPOSED WORK

In proposed work we have to acquire biometric data & analyze & validate it after transmission, signal processing, decision making & storing. We would use Matlab as simulation environment & would use edge detection techniques such as canny algorithm to find edge of samples & get matrix representation of stored images of faces or Finger prints. Then we would use various graphical techniques to compare them & comparison would be represented within form of Histograms.

Data Acquisition

Data collection involves use of sensors to detect & measure an individual's physiological or behavioral characteristics. biometric feature must have following characteristics:-

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Universality, which means that every person should have characteristic, Uniqueness, two persons should not have same term or measurement of characteristic Permanence, characteristic should be invariant with time, Measurability.

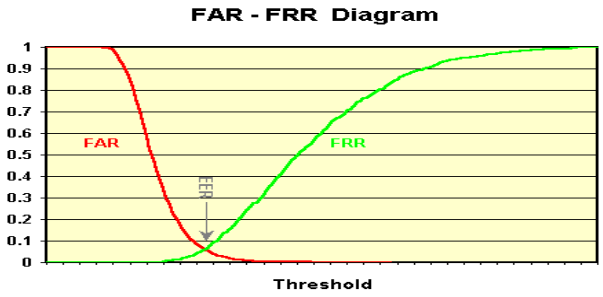

Fig. 2: FAR-FRR Diagram

Validity Of Test Data

Here, it checks for validity of processed data & decides whether person is authorized or not. Testing biometrics is difficult, because of extremely low error rates involved. To attain any confidence within statistical results, thousands of transactions must be examined.

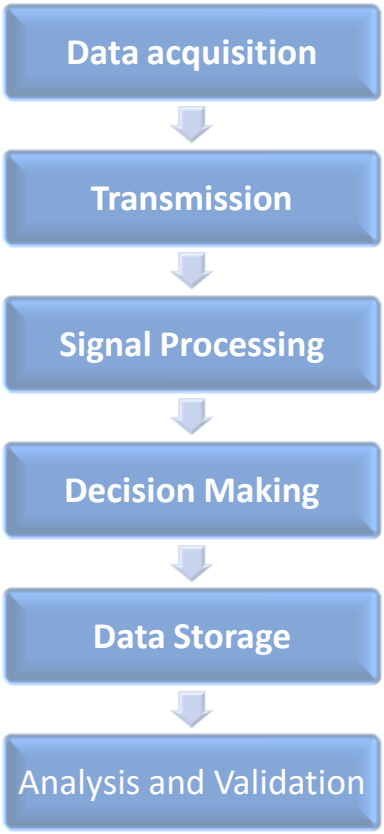

Fig. 3: Proposed Process To Compare Biometric Information

[5] RESULT & DISCUSSION

Image Processing In Matlab Using Edge Detection Mechanism

In Matlab we have used canny based edge detection to find edges of palm as it is consider better than other edge detection mechanisms.

```
im=imread('1.jpg');
imagesc(im);
```

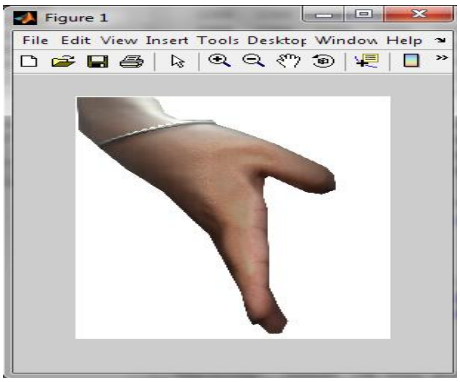

Fig. 4: Existing Image(1.jpg)

```
im=imread('1.jpg');
img=rgb2gray(im);
sob_im=edge(img,'sobel');
figure(2);
imagesc(sob_im);
axis('square');
colormap('gray');
imshow(sob_im);
```

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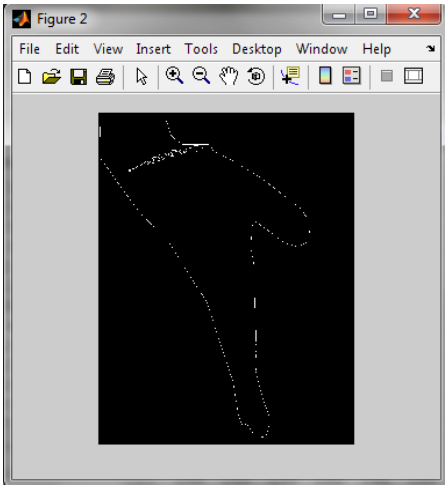

Fig. 5: Image(1.jpg) After Applying Sobel Operator Based Matlab Code

Design View Of 3D Based Biometric Comparison

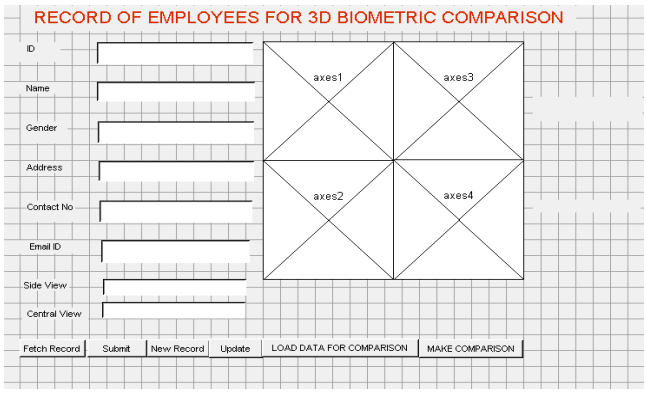

Fig.6: Design View Of 3D Based Biometric Comparison

To make comparison type side view & central view image name & load data for comparison

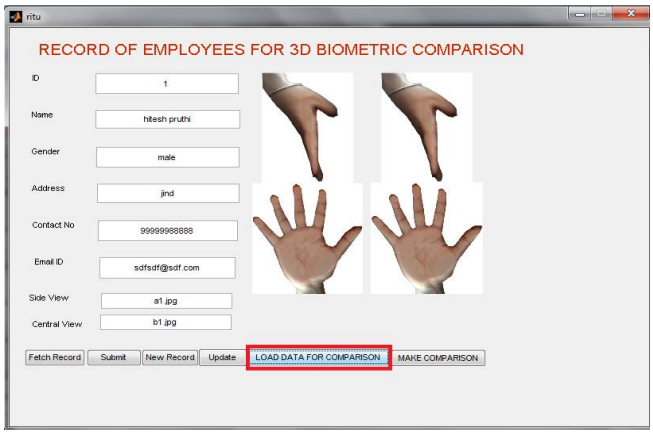

Fig. 7: Loading Of Images For Comparison

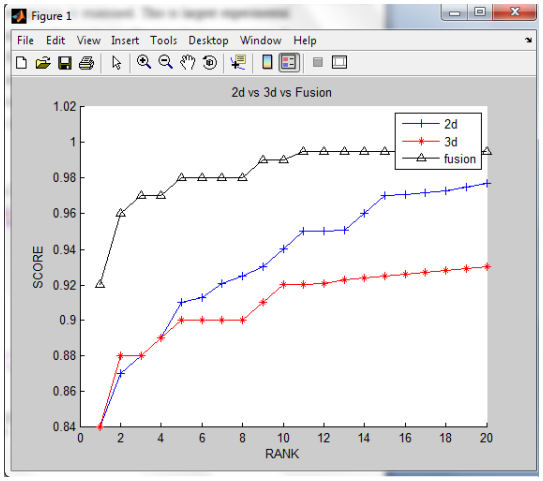

Fig 8 2d & 3d fusion

Implementation of Motion Sensor to capture biometric sample

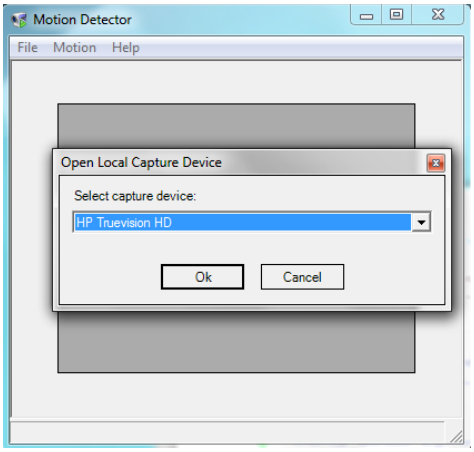

Fig 9 Capture device

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Fig 10 Motion Dector

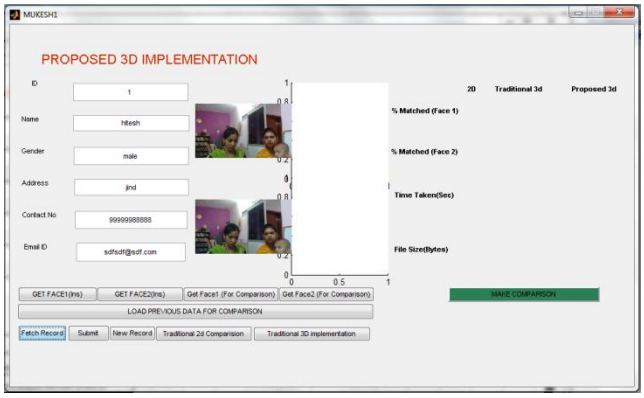

Fig 11 3D Implementation

	2D	Traditional 3d	Proposed 3d
% Matched (Face 1)	4.85893	4.85893	5.02431
% Matched (Face 2)		4.51895	3.49762
Time Taken(Sec)	0.027411	0.0597542	0.0164728
File Size(Bytes)	6636	13262	6977

Fig 12 Traditional 3d & proposed 3d

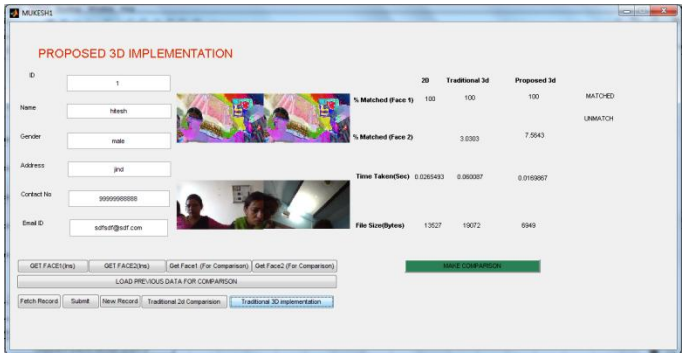

Fig 13 3D implementation

	2D	Traditional 3d	Proposed 3d	
% Matched (Face 1)	100	100	100	MATCHED
				UNMATCH
% Matched (Face 2)		3.0303	7.5643	
Time Taken(Sec)	0.0265493	0.060087	0.0169867	
File Size(Bytes)	13527	19072	6949	

MAKE COMPARISON

Fig 14 2D & 3D traditional proposed

	2D	Traditional 3d	Proposed 3d	
% Matched (Face 1)	100	100	100	MATCHED
% Matched (Face 2)		3.0303	7.5643	UNMATCH

	2D	Traditional 3d	Proposed 3d
Time Taken(Sec)	0.0265493	0.060087	0.0169867

	2D	Traditional 3d	Proposed 3d
File Size(Bytes)	13527	19072	6949

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Original image

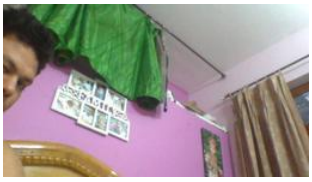

Fig 15 Original image

Key image

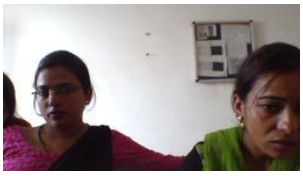

Fig 16 Key image

Encrypted image during comparision

Fig 17 Encrypeted image during comparision

Code to Capture image

```
axes(handles.axes1);
x11=get(handles.edit1,'string');
vid = videoinput('winvideo');
preview(vid);
start(vid);
set(vid, 'ReturnedColorSpace', 'RGB');
im = getsnapshot(vid);
im1=imresize(im,0.20);
imshow(im1);
```

Code to Encrypt image

```
t=imread('key.jpg');
ffff=bitxor(im1,t);
```

Code to Save image on disc

```
imwrite(ffff,strcat('F',x11,'.jpg'));
```

code to Stop image capturing

```
stop(vid);
delete(vid);
```

Code to compare Biometric samples , check comparison time, & check size

```
x11=get(handles.edit1,'string');

x=imread(strcat('C', x11 , '.jpg'));
t=canny(x,1,1,1);

x1=imread(strcat('CC', x11 , '.jpg'));
t1=canny(x1,1,1,1);

xr=imread(strcat('F', x11 , '.jpg'));
yr=imread(strcat('FF', x11 , '.jpg'));
t2=canny(xr,1,1,1);
t3=canny(yr,1,1,1);
tic
rrr1=ait_picmatch(t,t2);
rrr2=ait_picmatch(t1,t3);
xxxx=toc;
set(handles.text17,'string',xxxx);
set(handles.text10,'string',rrr1);
set(handles.text11,'string',rrr2);

if rrr1>50
set(handles.result1,'string','MATCHED');
else
set(handles.result1,'string','UNMATCHED');
end
if rrr2>50
set(handles.result2,'string','MATCHED');
else
set(handles.result2,'string','UNMATCHED');
end
imwrite(t2,strcat('FC', x11 , '.jpg'));
imwrite(t3,strcat('FFC',x11,'.jpg'));
imstate=dir(strcat('FC', x11 , '.jpg'));
size=imstate.bytes;
imstate1=dir(strcat('FFC', x11 , '.jpg'));
size1=imstate1.bytes;
set(handles.fs3,'string',size+size1);
```

[6] CONCLUSION

During this instance of time, several different glitches related to palm print recognition have been addressed. Furthermost of studies has been done in palm print recognition due to its stability, reliability & exclusivity. Furthermore, this has been employed for law enforcement, civil applications & access control applications. Verification rate could be computed by employing False Acceptance Rate (FAR), False Rejection Rate (FRR), as well as Equal Error Rate (EER). FAR is percentage of accepted not genuine claims over total number of not genuine accesses. FRR is percentage of rejected genuine claims over total number of genuine accesses. For 3 D recognition

multidimensional data has been taken & complexity of algorithm increases as array of matrix are compared in such cases. It would increase accuracy but takes lot of time on rendered images. So we have extract only useful part of biometric object such as pattern of palm in multidimensional form.

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