DEVELOPING SECURE AND FAST 3D BIOMETRIC SYSTEM : AN IMPLEMENTATION

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Abstract— The biometric based security has been upgraded in this research paper. Here the advance three dimensional biometric system has been proposed. This system would consume less space as well as it would take less time in processing. Here the use of edge extraction has been made in order to reduce the size of image. The best among them is canny based edge detection. The proposed work is fast during comparison process as only important edges have been compared.

Keywords— Biometrics, Matlab, Simulation, Physiological and Behavioural Characteristics

I. INTRODUCTION

Biometrics

The biometric based security has been divided on the bases of physiological and behavioural characteristics. The physiological characteristics consists of face, DNA, iris and finger recognition based biometric systems. But the behavioural characteristics involve keystroke, voice and signatures. The theme of this paper is to introduce the concept of security in cloud computer with biometric techniques.
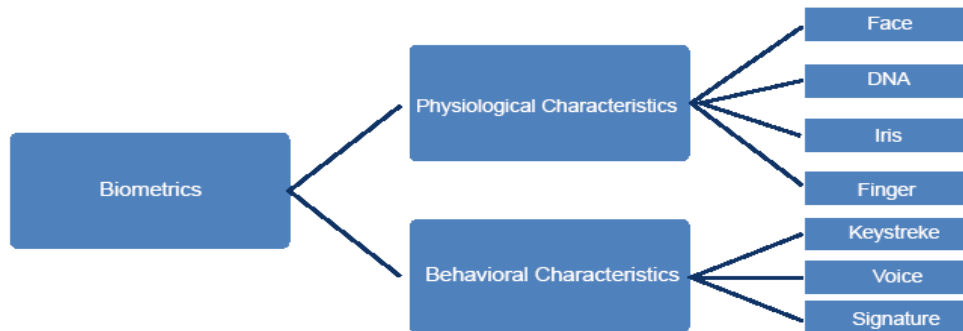

Fig 2 Physiological versus Behavioural characteristics

II. TOOLS & TECHNOLOGY

Edge Detection

In order to make the biometric detection fast we need the use of Edge detection mechanisms. These may be canny, sobel, prewitt and Robert. The best among them is canny based edge detection. The physiological characteristics are considered in this research the objective of research is to provide fast and more efficient biometric security to the cloud based systems.

In case of canny based 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 pre smoothing 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 variation 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.

The use of canny based edge detector would reduce the size of biometric sample as well as it provide quality output. The comparison process of biometric sample becomes fast as the unnecessary part of biometric sample is removed during edge extraction. Only the useful part is compared that result in space saving and time saving process.

III. PROPOSED WORK

In proposed work to provide security to the biometric data is acquired & analyzed & validated after transmission, signal processing, decision making & storing. Matlab has been used as simulation environment. In order reduce the size of image and comparison time edge detection techniques such as canny algorithm would be used to find edge of samples & get matrix representation of stored images of faces or Finger prints. Then various graphical techniques would be used to compare & comparison would be represented in form of Histograms.

Data Acquisition

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

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.

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.

PROPOSED MODEL

In our proposed work we have integrate cloud with database, remote application with biometric based security. The objective of proposed work is to reduce the time consumption during sample comparison as well as the size of biometric samples.
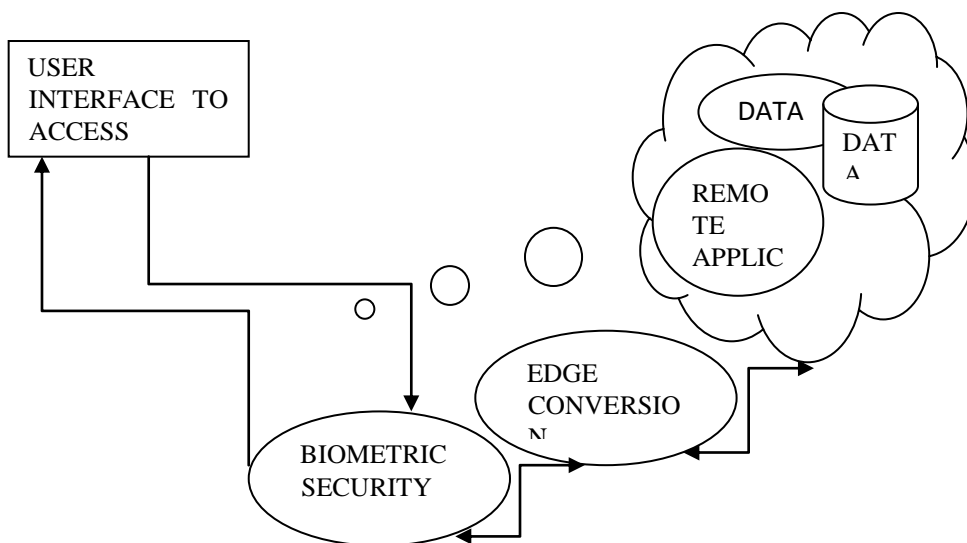

Fig 3. Proposed Model

IV. 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. Here we have make comparison in edge detection by sobel and canny. First an image is taken.

Fig. 4 Existing Image(palm.jpg)

Following is the code to implement sobel operator.

%Following code would read image matrix and store in im

im=imread('palm.jpg');

% the image is displayed here

imagesc(im);

%Following code would read image matrix and store in im

im=imread('palm.jpg');

% In Following code image is stored in rgb2gray

img=rgb2gray(im);

%Following code would extract sobel image from sob_im.

sob_im=edge(img,'sobel');

figure(2);

%Sobel image is displayed on screen

imagesc(sob_im);

axis('square');

colormap('gray');

imshow(sob_im);

The above code is saved with .m extension. When we run application then following window appears. Here we have compared the original image with edge based image in both cases sobel based and canny based.
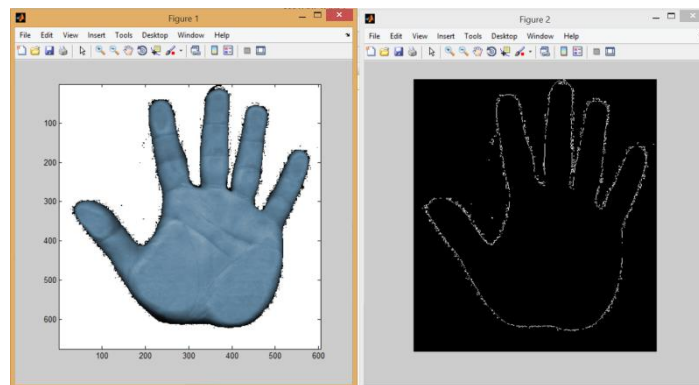
Fig. 5 Image(palm.jpg) After Applying Sobel Operator Based Matlab Code
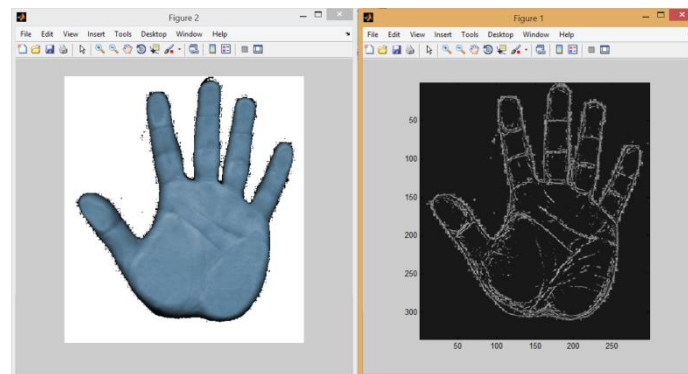
Canny based edge detection

Fig. 6 Image(palm.jpg)After applying canny based edge detection in Matlab

Above biometric system is providing security to the web based wallet on remote cloud server. The amount received, paid and balances are maintained on this remote portal that is made secure with integration of biometric.
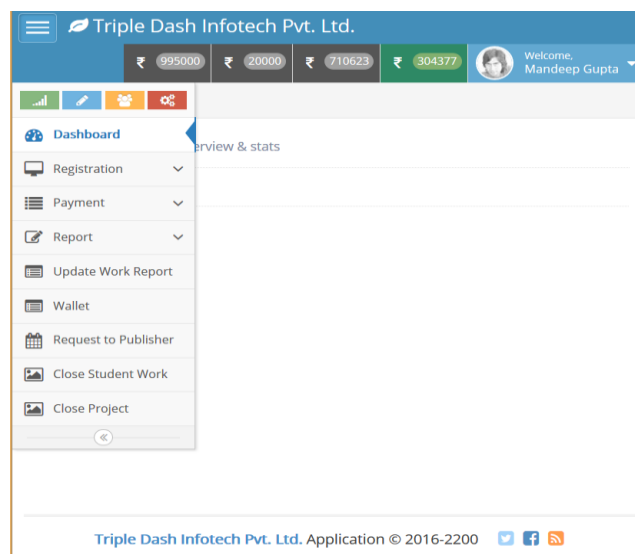

Fig 7 Fund management system

The registration of student are made here and with their course, general detail and the fees of their course.
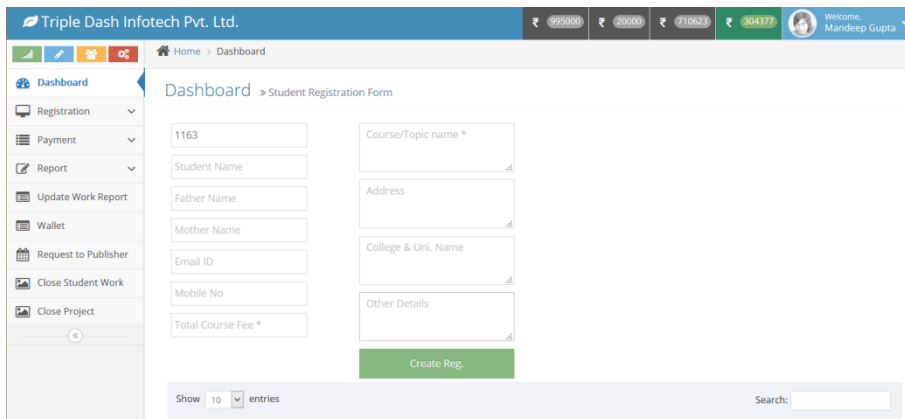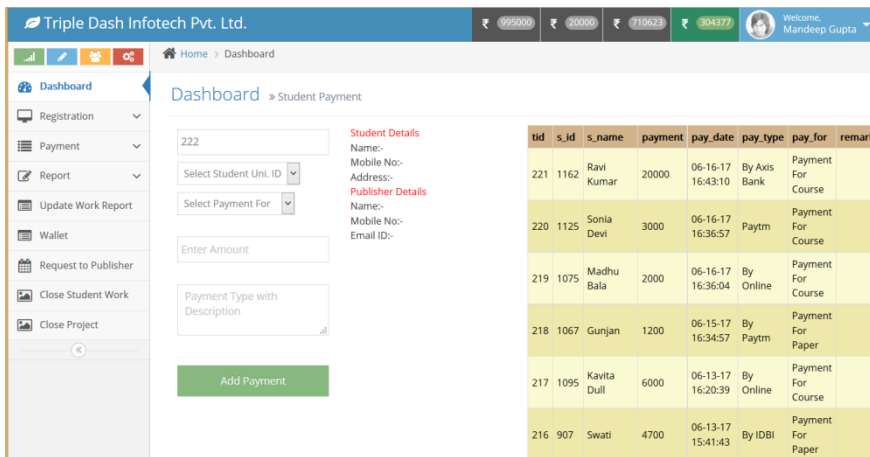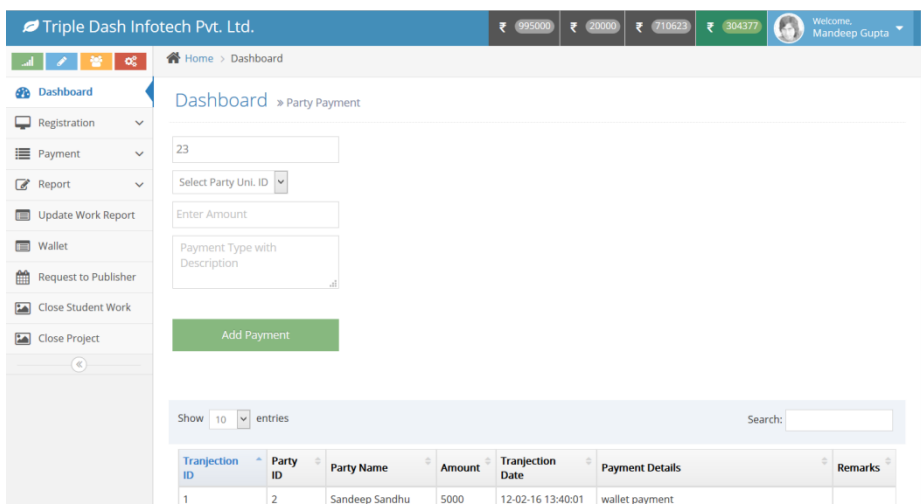
Fig 8 Student admission Form

The record of payment is maintained here. User could make transaction and view the report.

Fig 9. Student Payment System

Payment received from party are represented in following window

Fig.10 Party Payment System.

V. CONCLUSION

As we can conclude from above result that the use of edge detection image would increase the security of Biometric based cryptographic techniques. The need of Biometric based cryptographic techniques is increasing daily. People who use web services on Biometric based cryptographic techniques require the security to their data. They take advantage of remote storage and remote services from Biometric based cryptographic techniques. They access files remotely from cloud servers. They also run their application on Biometric based cryptographic techniques. This technique would provide security to mobile, laptops, tablets and personal computers that are connected to cloud servers.

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