Cardless Automated Teller Machine

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Abstract

There area unit serious debates on the affiliation of ATM technology as most countries inside the globe area unit moving far from the virus technology to plenty of secured chip cards free of credit and debit frauds. Several problems area unit associated with the employment of ATM card such card scientific research, card damaging ,card exploring ,cost skimming,cost provision and maintenance and accessing shopper account by third parties. This project deals with the event of iris primarily based card less ATM. The machine has iris detector that gives the primary shopper detection. The aim of this project is to convey a freedom to the user by dynamic the cardboard to biometric security system. This vogue offers a secure banking human action once shopper detection the additional level of security is provided practice Aadhar. On productive completion of the authentication methodology, shopper area unit allowed to finish the bank transactions.

Keywords: Iris recognition, Libor Masek Algorithm, Fingerprint Recognition, GLCM, Minutiae Extraction.

INTRODUCTION

The main goal of our project is to develop a secured ATM system .The existing self-banking system has got very high popularity with 24 hours service. Use of ATM (Automatic Teller Machine) is helpful for money transaction.ATM is activated by placing the card, then entering the pin number of the particular card. But this system is not safe to use because anybody can access the system if they have the card and pin number like we share our card and pin number to our friends who may misuse it. In recent years,the algorithmic rule that the fingerprint recognition ceaselessly updated,which has offered new verification suggests that for us, the initial secret authentication methodology combined with the biometric authentication technology verify the users establish higher and accomplish the aim that use the ATM machines improve the protection. In the planned system we tend to try to get rid of disadvantages of existing system. Thus security over cash group action is our prime concern. In ancient system consumer should carry debit and mastercard with him to verify his identity. This positive identification could also be,so rather than ancient identification we tend to area unit mistreatment biometric authentication.Iris and Fingerprint recognition possesses ceaselessly updated algorithmic rule in recent years that mean good biometric authentication. The aim of the project is to style a model to offer high security whereas transactions within the ATM. Main objective of this project is to develop a system by that the authentication is being provided by creating use of distinctive code and iris recognition.

METHODOLOGY

The Iris of the customer is scanned using the iris sensor and a confirmation query will be displayed on the LCD display, requesting the customer to select the account as the primary account holder or as the Nominee account holder. After the

appropriate selection by the customer the next step of verification will be continued. It is a Verification step. In this step aadhar number of the primary account holder is to be entered in the display via keypad.It is a confirmation step. The fingerprint of the customer is scanned.When the steps from 1- 3 is completed successfully, the account details from the various banks of the Primary account holder will be displayed on the LCD display. The customer should specify the required account in which the transaction is to be made. Thereafter the process proceeds by the wish of the customer whether they have to withdraw the money or deposit the money or enquiry of account balance.The next procedures of the process will be continued as that of the conventional ATM.
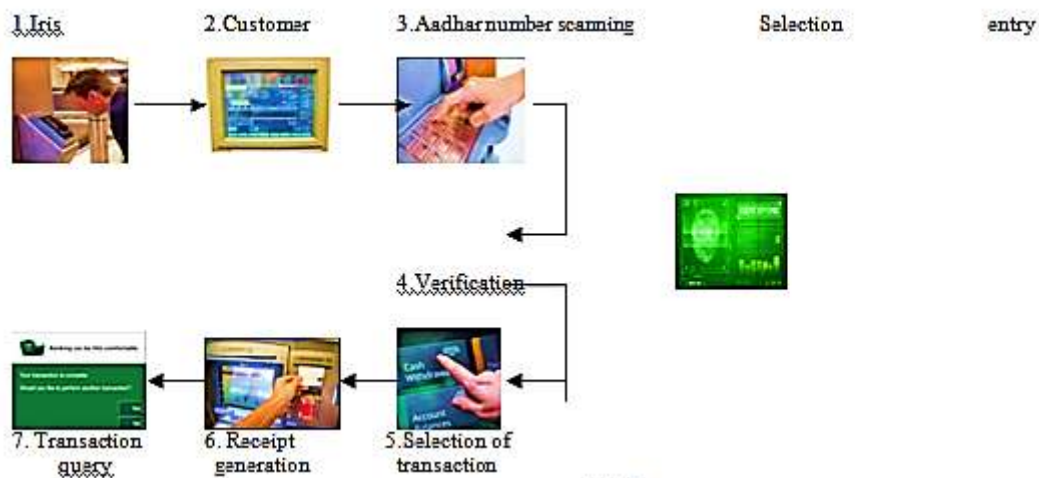

Fig.1:*Proposed System*

IRIS RECOGNITION

Eye color is outlined by that of the iris. In optical terms, the pupil is that the eye's aperture, whereas the iris is that the diaphragm. The iris may be a skinny circular diaphragm, that lies between the membrane and therefore the lens of the human eye. The iris is perforated about to its centre by a circular aperture referred to as the pupil. The operate of the iris is to regulate the number of sunshine getting into through the pupil, and this is often done by the sphincter muscle and therefore the dilator muscles, that change the scale of the pupil. The common diameter of the iris is twelve mm, and therefore the pupil size will vary from 100 percent to 80th of the iris diameter.

The iris consists of variety of layers, very cheap is that the animal tissue layer, that contains dense pigmentation cells. The stromal layer lies higher than the animal tissue layer, and contains blood vessels, pigment cells and therefore the 2 iris muscles. The density of stromal pigmentation determines the color of the iris. The outwardly visible surface of the multi-layered iris contains 2 zones, which regularly take issue in color. An outer ciliary zone and an inner aperture zone, and these 2 zones are divided by the collarette – that seems as a zigzag pattern.
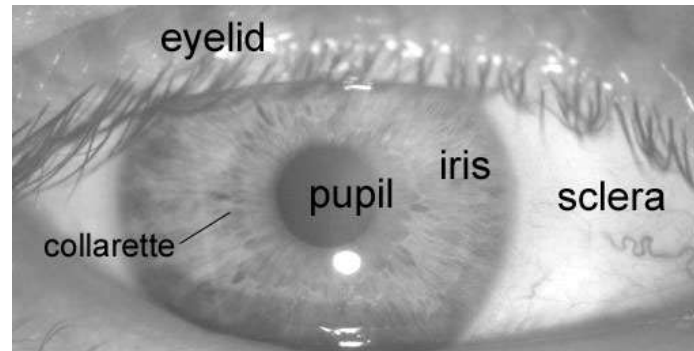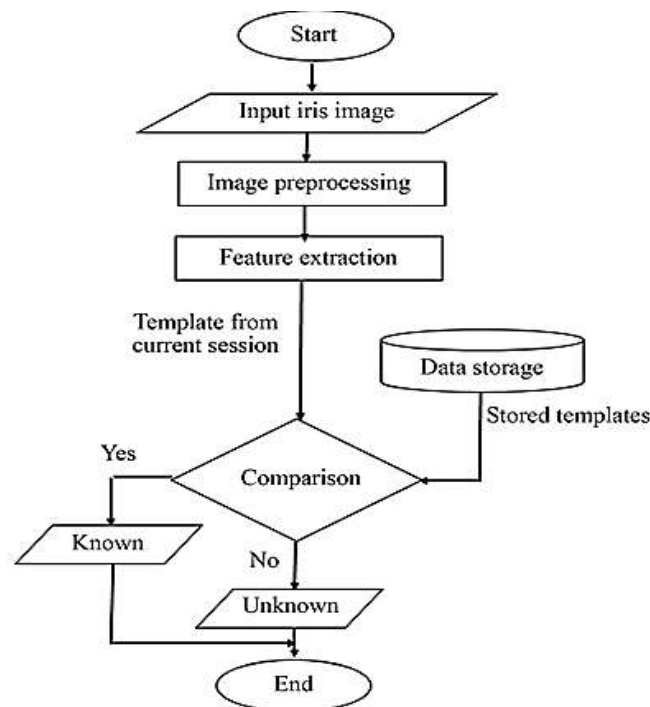
Fig.2: *Eye*

(a) Flowchart of Libor Masek algorithm

Fig.3: *Flowchart*

The Libor Masek Algorithm undergoes IRIS recognition in 3 effective ways. They are
Pre-processing
1. Feature Extraction
2. Post-processing

In pre-processing steps the following operations were done.
- Iris and Pupil Segmentation
- Iris and pupil Normalization
- Adaptive Histogram Equalization

Iris Pre-processing
1. Iris must be resized to a particular size.
2. Median filter is used to reduce the noise in the frame.
3. The main idea of the median filter is to run through the image entry by entry replacing each entry with the median of neighbouring entries.
4. Median filter is a non-linear filter mostly used to remove the impulsive noise from an image.
5. This is one kind of smoothing technique.
6. This median filter filtering is very widely used in digital image processing.

Iris and Pupil Segmentation
The part of the eye carrying information is

only the iris part. It lies between the sclera and the pupil. The next step after acquiring the image is to segment the iris and the pupil. The image was filtered using Median filter. The iris inner and outer boundaries are located by finding the edge image using the Canny edge detector,then using the Hough Transform to find the circles in the edge image

$$X^2 + Y^2 = r^2 \qquad (1)$$

Where X and Y are the centre of the circle and r is the radius of the circle.The main advantages of the Hough Transform technique are its tolerance for gaps in feature boundary descriptions and robustness to noise.

The Hough transform process is clearly explained in the below figure Fig.4.
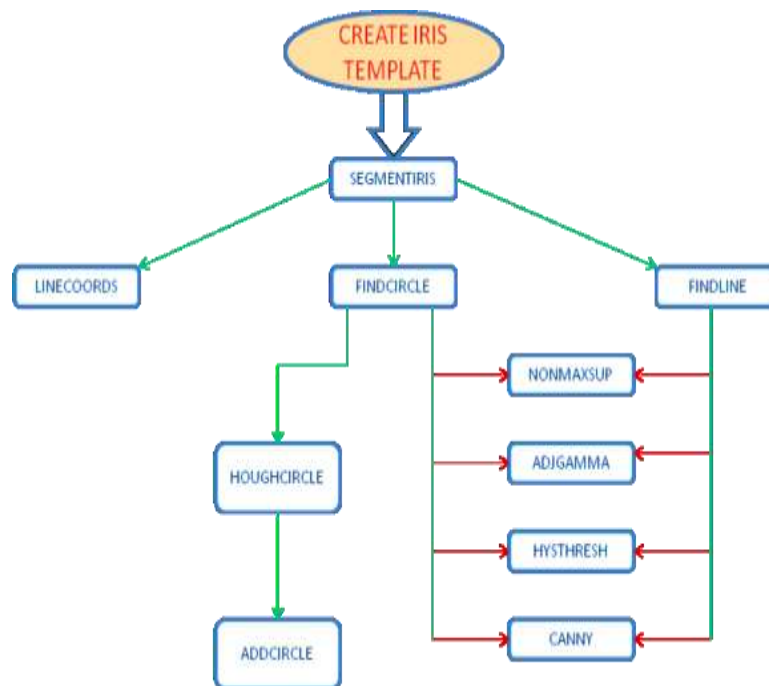

Fig.4: Hough transform process

Normalization

Once the iris region is segmented, the next stage is to normalize this part, this enable the generation of the "iris code" and their comparison. Normalisation is the main part of iris recognition so as to differentiate one person from another.In this process the Cartesian coordinates is converted to polar coordinates.

$I(x\,(r,\theta),\ y\,(r,\theta)\,) \rightarrow I(r,\theta)$

With: $\quad x(r,\theta) = (1-r)\,x_p(\theta) + r x_i(\theta)$

$y(r,\theta) = (1-r)y_b(\theta) +\ r y_i(\theta)$

Adaptive Histogram Equalization

Adaptive bar graph effort may be a methodology of distinction sweetening. It's completely different from normal bar graph effort. In adjustive methodology, several bar graphs area unit computed wherever every histogram corresponds to a special section of image. Hence, AHE improves the native distinction of a picture and additional details are often ascertained .With this methodology,information of all intensity ranges of the image are often viewed at the same time. There area unit several normal show devices that aren't able to depict the total dynamic intensity vary. This methodology brings the answer to the current drawback. Benefits of adjustive bar graph area unit to boost image distinction, duplicatable and automatic.
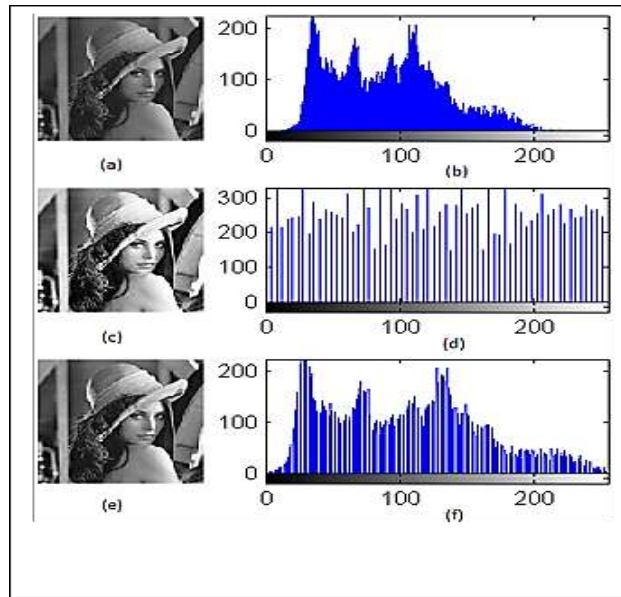
Fig.5: *Histogram*

Feature Extraction

The method used here for the feature extraction is that the grey Level Co-occurrence Matrix (GLCM). Additionally referred as co-occurrence distribution. It's the foremost classical second order method for texture analysis. A picture consists of pixels every with associate intensity (a specific grey level), the GLCM may be a tabulation of however usually totally different combos of grey levels co-occurrence in a picture .Texture calculation uses GLCM to provide the live of variation of intensity.GLCM texture feature operator produces the virtual variable that specifies the calculation of single beam echogram.

Steps for virtual variable creation:

1. Quantize the image
2. Create the GLCM
3. *Calculate the selected Feature.* This calculation uses only the values in the GLCM. For e.g.

* Energy,
* Entropy,
* Contrast,
* Homogeneity,
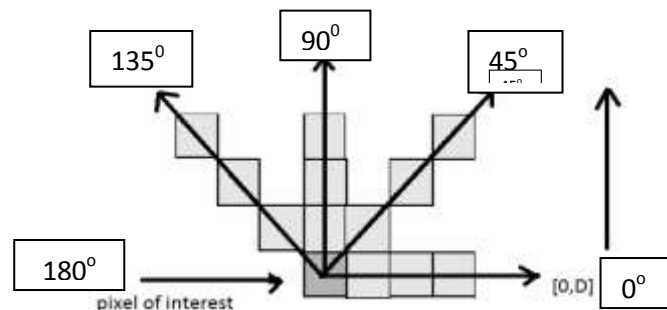* Correlation,
* Shade or
* Prominence

Fig.6: *GLCM direction analysis*

The fig. 6 illustrates the GLCM direction analysis.

Iris Post Processing

After completing the pre-processing and feature extraction processes, the Iris now

undergoes post-processing. Here the filtered and segmented iris and their extracted features are compared with that of the database values for matching and the result is generated.

Then the account holder type of the customer is chosen and the aadhar number of their account category is entered as pin and the process continues for the next step, which is the verification step. Here Fingerprint is used for verification process.
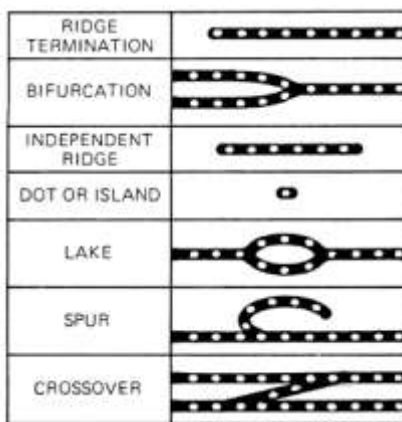

Fig.7:Iris Post Processing

FINGERPRINT RECOGNITION:
Among all biometric traits, fingerprints have one amongst the best levels of responsibleness and are extensively utilized by rhetorical specialists in criminal investigations. Even identical twins having similar DNA, are believed to possess totally different fingerprints. It's extracted by making associate inked impression of

tip on paper. These sensors may be simply incorporated into existing laptop peripherals just like the mouse or the keyboard. This has semiconductor diode to the magnified use of automatic fingerprint-based authentication systems in each civilian and enforcement applications.

Fingerprint Representation
The uniqueness of a fingerprint is decided by the geographics relief of its ridge structure and also the presence of bound ridge anomalies termed as trivialities points. The ridge flow pattern itself isn't used for matching finger.

FINERPRINT ALGORITHM
Fingerprint extraction consists of three main steps, and they are
1. Pre processing
2. Minutiae extraction
3. Post-processing

STEPS FOR PREPROCESSING:
- Image enhancement
- Filtering
- Binarization
- Thinning

STEPS FOR MINUTIAE EXTRACTION
- Minutiae extraction

STEPS FOR POST-PROCESSING:
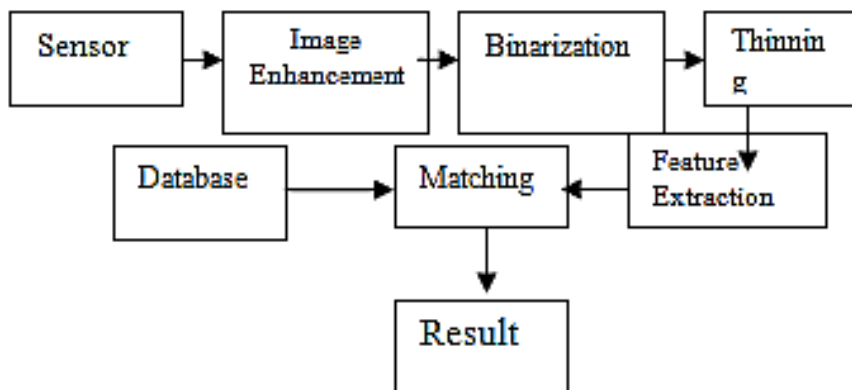- False minutiae removal

Fig.8: False minutiae removal

Image Enhancement

Image sweetening techniques are typically used to cut back the noise and to boost the definition of ridges against valleys in order that no spurious trivialities are known. Originally, the sweetening step was purported to be done exploitation the cagy edge detector.

However when trial, it seems that the results of a position detector is a picture with the borders of the ridges highlighted. Exploitation edge detection would need the employment of an additional step to fill out the shapes which might consume a lot of interval and would increase the complexness of the code, as shown in figure.

Fig.9: Image Enhancement

Binarization

The separation of the object and background is known as binarization. A gray scale picture is turned into a binary picture

Thinning

The thinning algorithm removes pixels from ridges until the ridges are one pixel wide.There are several methods also available are thinning .Then the minutiae are extracted from the enhanced, binarized and thinned image.
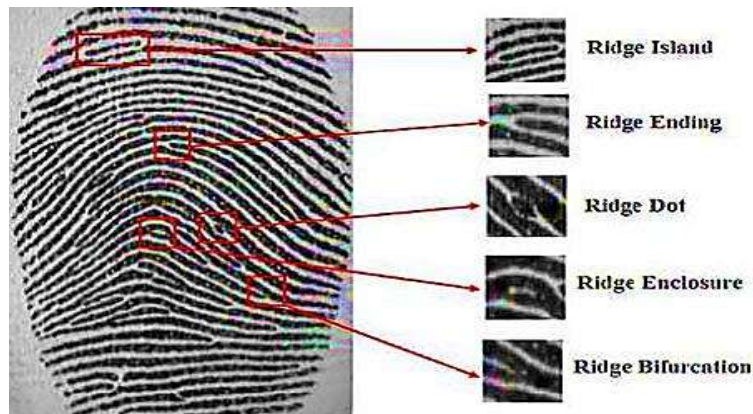

Fig.10: Thinning

Minutiae Extraction

The trivialities feature representations scale back the advanced fingerprint recognition drawback to some extent pattern matching drawback. Variety of binary image based mostly strategies are on the market that observe trivialities by inspecting the localized picture element patterns .They can be any classified into 2 strategies, people who work on unthinnedbinarized pictures and people that employment on dilute binarized pictures. A fingerprint consists of 2 basic kinds of trivialities, ridge endings and bifurcations. The trivialities and their relative positions to every alternative are then used for comparisons. It's so evident that a lot of correct the method of extraction of trivialities, the a lot of correct and reliable the whole machine-controlled fingerprint recognition system becomes.

Postprocessing

In this step the captured and also the image saved within the information are compared and checked whether or not they are matched. When the popularity of the fingerprint, the client is asked to pick out the specified Bank from that they need to proceed the dealings method and it the continues as that of the present ATM.

RESULTS AND DISCUSSION
Iris Output

Fig.11:Iris Output

In the on top of output window,the iris of the client is loaded as a input. Then the loaded image is born-again from RGB to grey level. The pre-processing and post-processing steps are done exploitation Libor Masek algorithmic rule, then the iris image is normalised and filtered .The next method is sweetening that is completed by adaptive bar graph deed. The feature extraction values of the improved image are going to be displayed within the resultant window.
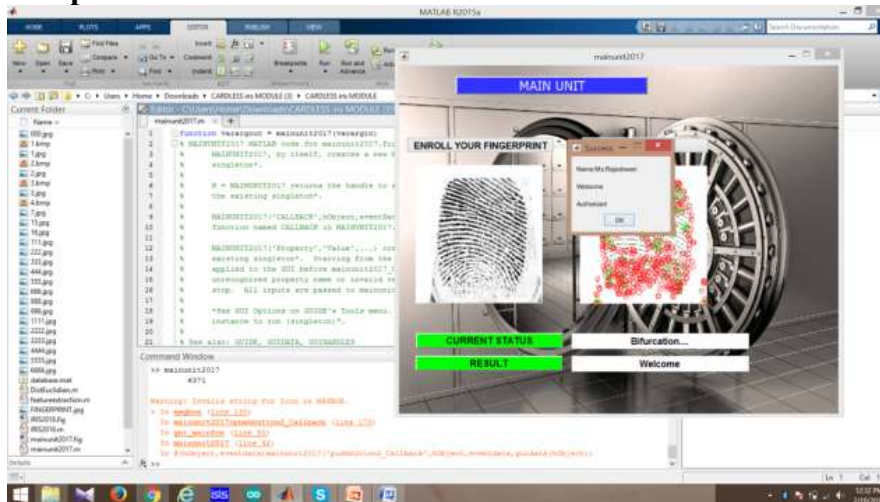
Fingerprint Output

Fig.12: Fingerprint Output

In the above output window,the fingerprint of the customer is loaded as an input for further verification step. The process for fingerprint is as follows:
- Normalization
- Segmentation
- Orientation Estimation
- Filtering
- Binarization and Thinning

CONCLUSION
This card less ATM, if enforced can facilitate to eliminate the issues that are related to the employment of ATM cards, enhance the potency in ATM usageand reduces congestion in banking. The system

can uses each biometric associated aadhar variety as an access technology.

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