



Secured and Cardless ATM using Iris

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ABSTRACT: A biometric framework gives automatic identity proof of an individual based on unique characteristics or features of the individual. As demands on secure identification are hiking and as the human iris gives a pattern that is phenomenal for identification, the utilization of inexpensive equipment could help iris recognition turn into another standard in security framework. Iris recognition is viewed as the most reliable and precise biometric identification framework available. The principal point of this project is to study the unique pattern of the iris in the eye.

KEYWORDS: Iris Scanner; Arduino based micro-controller; recognition of iris ; matching the templates ; withdrawal of money through iris scanning.

I. INTRODUCTION

As demands on secure identification are hiking and as the human iris gives a pattern that is phenomenal for identification, the utilization of inexpensive equipment could help iris recognition turn into another standard in security framework. Iris recognition is viewed as the most reliable and precise biometric identification framework available. A test situation depending upon the open source code can be built to measure the performance of iris recognition techniques, image quality, and acceptance rate. In this project, the image quality of images as data from a database acquired from a standard camera is surveyed, the most imperative issue areas recognized, and the overall general recognition performance measured. The purpose of this project will be to implement an iris recognition and identification system which can authenticate the claimed performance of the methodology. The main objective of the proposed application is to identify an individual with high efficiency and accuracy by analyzing the random patterns visible within the iris of an eye.

II. PROBLEM STATEMENT

Conventionally passwords, secret codes and PINs are used for identification which can be easily stolen, observed or forgotten. In pattern recognition problems, the key issue is the relation between inter-class and intra-class variability: objects can be reliably classified only if the variability among different instances of a given class is less than the variability between different classes. For example in face recognition, difficulties arise from the fact that the face is a changeable social organ displaying a variety of expressions, as well as being an active 3D object whose image varies with viewing angle, pose, illumination, accoutrements, and age. So as an alternative we propose to use biometrics (iris recognition) system to identify an individual.

III. PROPOSED SYSTEM

In the proposed system image processing technique is used to extract the unique iris patterns from a digitized image of the eye, and encode it into a biometric template, which can be stored in a database. The biometric template contains objective mathematical representations of unique information stored in the iris, and allows the comparison to be made between the templates. When subject wishes to be identified by iris recognition system, their eyes are first photographed, and then template is created for their iris region. This template is then compared with the other templates stored in the database until a either a matching template is found and the subject is identified, or a no match is found and the subject is unidentified.

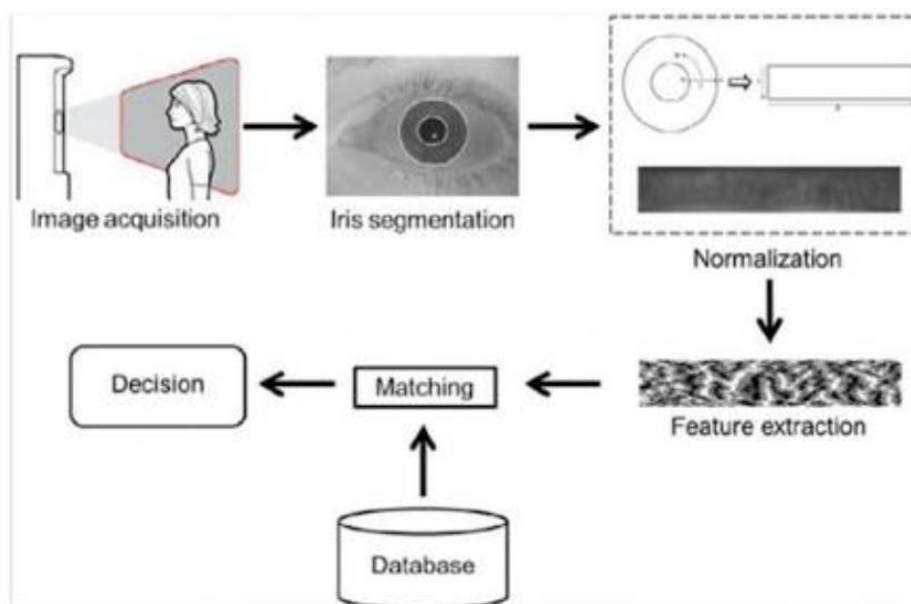


FIG 1 SYSTEM ARCHITECTURE

The step by step process is given below.

1. Firstly, Admin of the bank account use the desktop based application which is developed using java swings. Once the admin's login credentials are verified by the server, he can add the customer and scan the iris of the customer. These details are stored in the server. Admin can add the amount to customer's account. Whenever the customer goes to the ATM machine, his iris will be scanned using the iris scanner to get a better image clarity.
2. In the second step, image processing will be done to enhance the image. Here, grayscale is used for image processing. Grayscale is preferred over the colored ones to simplify the mathematics. During preprocessing RGB image is converted into grayscale. As computer can understand only grayscale images so it is preferred over the colored ones. Grayscale images are stored as an 8-bit integers in the form of 0's and 1's.
3. Next, segmentation will be carried out. It is the process of partitioning the image into multiple segments so that the representation of the image will be more easier and meaningful to analyze. Image segmentation is basically performed to locate the Iris object in image. Two methods to perform the segmentations are

iCanny edge Detection

Here edge() function is used. Edge function will take an image as input. General form is
 Output= EDGE(Input,'canny', THRESH)
 Edge function will return a array with the values 1's and 0's.

ii Hough Transform:

This method is used to find the circles in the image. Equation of the circle is:

$$r^2=(x-a)^2+(y-b)^2 \quad r \text{ is the radius of the circle. } (a,b)= \text{ center co-ordinates of the circle.}$$

Here we need to detect two circles, outer circle of pupil and outer circle of iris. For every value of pixel (x,y) and r we have to plot circle in 3D axis so that we get many cone shaped circles. After this we should find the point with the maximum number of intersections. This point gives the (a,b,r) value. From that we can detect the two circles which represents the iris

4. Once the iris is segmented, next stage is to transform the iris region so that it has fixed dimensions in order to allow the comparisons. Normalization process involves unwrapping the iris and converting it on to its polar equivalent. This process is done using Daughman'sRubbersheet model.
5. Next is the feature extraction. It is the process of reducing the raw data into more informative data. In order to recognize the individuals accurately, the most discriminating features that present in the region must be extracted. The iris contains unique features such as, stripes, freckles, rings and zigzag collarette. Feature extraction is done using Fast wavelet Transform algorithm.
6. Next step is to classify the iris. It is done with the help of various features calculated in the previous step. For this we will use support vector machine algorithm. Classification can either supervised or unsupervised, but we are using supervised classifications. SVMs are based on the idea of finding a hyperplane that best divides a



datasets into two classes. On x-axis we take the extracted features and on y-axis we take each customer's name and plot the graph.

- Final step is analyse the result. Once the iris is being scanned and detected, the linked account number is checked. Based on that account number account information is being sent to the ATM machine display. The display is connected to raspberry pi and touch screen option. It displays features like balance check, cash withdrawal, transfer amount. Based on the requested amount the controller sends the requests and cash will be dispensed.

IV. SOFTWARE & HARDWARE

A. Software

ARDUINO IDE

The **Arduino** Integrated Development Environment (**IDE**) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

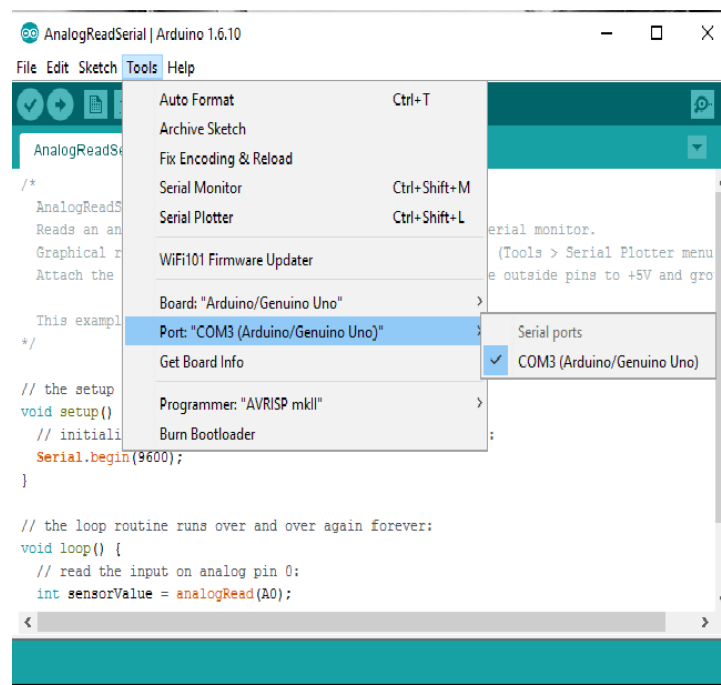


Fig 2 Arduino IDE

NET BEANS IDE

NetBeans IDE is the official IDE for Java 8. With its editors, code analyzers, and converters, you can quickly and smoothly upgrade your applications to use new Java 8 language constructs, such as lambdas, functional operations, and method references. Batch analyzers and converters are provided to search through multiple applications at the same time, matching patterns for conversion to new Java 8 language constructs. With its constantly improving Java Editor, many rich features and an extensive range of tools, templates and samples, NetBeans IDE sets the standard for developing with cutting edge technologies out of the box. An IDE is much more than a text editor. The NetBeans Editor Indent lines, matches words and brackets, and highlight source code syntactically and semantically. It also provides code templates, coding tips, and refactoring tools.

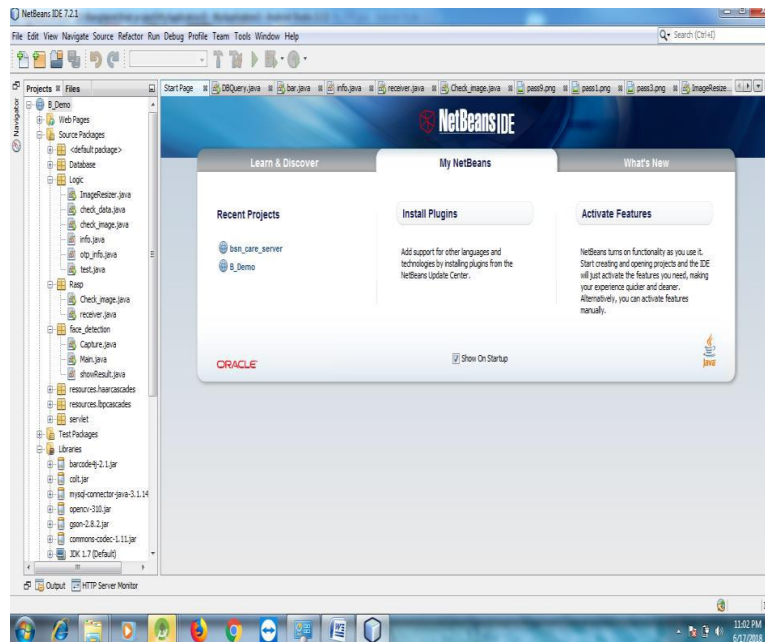


Fig 3 Net Beans IDE

MySQL

MySQL ("My Sequel") is (as of 2008) the world's most widely used open source relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. The SQL phrase stands for Structured Query Language.

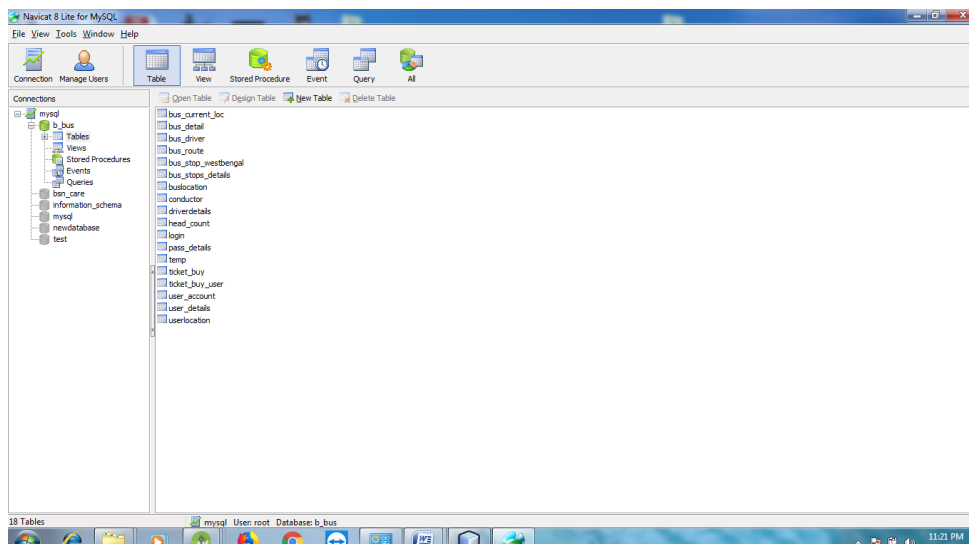


Fig 4 MySQL

B.Hardware

ARDUINO

An Arduino is an open-source microcontroller development board. In plain English, you can use the Arduino to read sensors and control things like motors and lights. This allows you to upload programs to this board which can then interact with things in the real world. With this, you can make devices which respond and react to the world at large.



Fig 5 Arduino

RASPBERRY PI

The Raspberry Pi device looks like a motherboard, with the mounted chips and ports exposed (something you'd expect to see only if you opened up your computer and looked at its internal boards), but it has all the components you need to connect input, output, and storage devices and start computing. You'll encounter two models of the device: **Model A** and **Model B**. The only real differences are the addition of Ethernet and an extra USB port on the more expensive Model B.

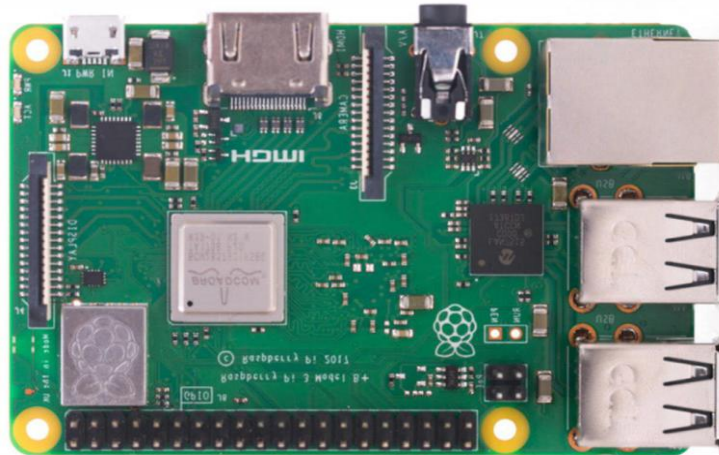


Fig 6 Raspberry Pi

IRIS SCANNER



Fig 7 Iris Scanner

V. RESULTS

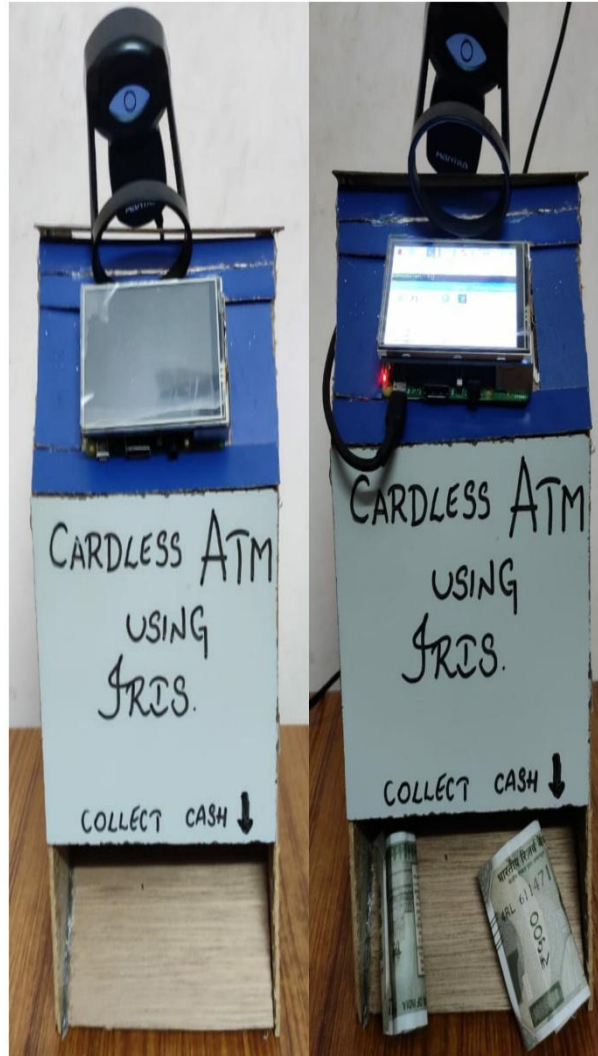


Fig 8 Cardless ATM Machine model

VI. CONCLUSION

The use of iris recognition system has been seen in various areas of life such as airport, crime detection, business application, various research firm and industries, experts anticipate the growth of iris recognition system. The study showed that the use of iris recognition system is expanding worldwide as the public has been oriented about the necessity of iris recognition system. For instance, iris recognition system is used in banks where it is incorporated into the Automated Teller Machines (ATMs).

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