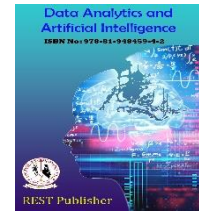




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# Cardless Withdrawal of Money Through Face and Iris Based Detection Using Haar Cascade Algorithm

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**Abstract:** The illegal activity of ATM machines comes with the issue of being accessed by illegitimate users with valid authentication code. This project provides service to the user who can't even use their ATM card. Here the face detection and iris of user is been detected. In a biometric system a person is identified automatically by processing the unique features that are posed by the individual. Iris Recognition is regarded as the most reliable and accurate biometric identification system available, so that we are implementing both the iris and face detection for more security. The users are verified by comparing the image and iris of eyes taken in front of the ATM machine, to the images which are present in the database. If the person is unauthorized then an image will be captured and send to an authorized person through a mail. This system uses open CV to process to identify the image and iris of person. In this project we have also implemented the feature which is extended the limit from 4000 to 10000. A user can withdraw up to 10,000 more. This project is based on machine learning which is being obtained with Haar Cascade Classifier and face landmarks algorithm to detect the faces in the image and iris of person. The face recognition and iris is done by using Haar cascade algorithm. The main of this protect is withdraw money in very secure process.

## 1. INTRODUCTION

An Automatic Teller Machine (ATM) is a computerized machine that is used to withdraw cash from a customer's respective bank account. As financial users prefer ATM for cash withdrawals, cash deposits and many other transactions, the banks are focusing a lot over the security of ATMs. Hence ATM should be protected properly from the criminal activities or from any unwanted things. Due to rapid development in science and technology, upcoming innovations are being built-up with strong security. But on the other hand, threats are also being posed to destroy this security level. Though enhancement in automation has made a positive impact overall, various financial institutions like banks and applications like ATM are still subjected to thefts and frauds. The existing ATM model uses a card and a PIN which gives rise to increase in attacks in the form of stolen cards, or due to statically assigned PINs, duplicity of cards and various other threats. Then another major problem is hacking of PIN. There are other fraudulent attacks like eavesdropping, spoofing, brute force attacks, black mailing the user. In the worst case there can also be ATM machine Robbery and theft [3]. To overcome these problems, they implemented the facial recognition based on linear discriminant classification which has major drawbacks [6]. The project ATM Security system based on Face and iris recognition [1], PIN consists of conventional features i.e. is Personal Identification Number (PIN) along with additional features like face recognition and user can enter the password in three attempts, if it is wrong again and again then the open CV will capture an image and send to the authorized person. Database holds information about a user's account details, images of his/her face and a mail id which will improve the security to a large extent. First, the user will come to the ATM machine and a live image is captured through the Web Camera interfaced with System defining as the ATM system, which is compared with the images stored in the database. If the face is recognized, then the user is notified to type the password. If the password matches, then they can withdraw money up to 10,000. Therefore, the combination will run by the Haar cascade classifier and face landmarks algorithm, it is considered as the techniques for face recognition [7].

## 2. OBJECTIVE

This project is designed for increasing more security in ATM machine. The Face and iris recognition is preferred to have high priority, as the combination of these biometrics proved to be the best among the identification and verification techniques of authorized person. The users are verified by comparing the image taken of face and iris in front of the

ATM machine, to the images which are present in the database camera identifies the unauthorized person the alert messages and image will be captured and then send to card holder and bank manager. The main aim of this project is to increase the limitation in amount taking and for increasing more security in individual account.

### **3. EXISTING SYSTEM**

In the existing system there are many ways to secure the ATM system which are finger print recognition which is done through pattern recognition.[4].The another method is done through OTP based system but this can be easily hacked and identified by the unauthorized person or hackers[2].The next method is facial recognition[5] ,In this method they are implementing the Convolutional Neural network algorithm to train the models. Here they compare the trained model images with the 2D images or face. The algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier which may not give an accurate result. The algorithm of convolution neural network (CNN) used in this process will be very complex and which results in complexity to give an accurate result, the given result has obtained the accuracy of 85%. Training the database will require lot of time that may take more than a day also, so it requires lots of time to train the database and the results we get not even very accurate.

### **4. DISADVANTAGES**

Each feature is a single value obtained by subtracting the sum of the convolution neural network algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. While training database will algorithm high level of system are needed which also results in cost of increasing project. In this algorithm, a facial image is a point from a low-dimensional image space and a lower-dimensional representation is found, where classification becomes hard. In this case the chances of fraudulent is more because the unauthorized person will take the photo copy of authorized person and they will show it in the camera.so this will match with the database as the algorithm is based on 2D images.

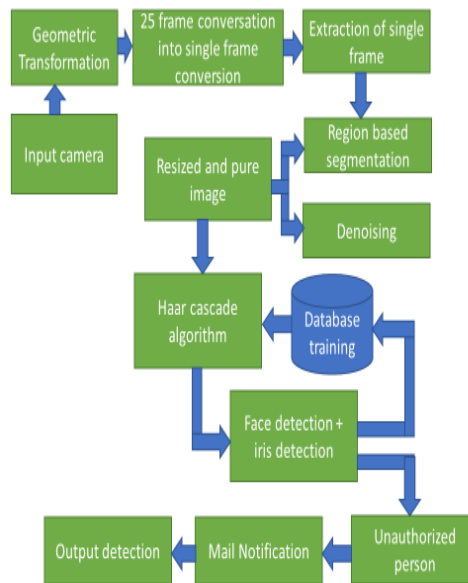
### **5. PROPOSED SYSTEM**

In proposed system the open CV will recognize the face and iris of a person who is standing before it, the face and iris matches with the database it get through the next processes. If it recognize that the person is unauthorized then the image of the person will be captured and alert message will be send to the card holder and bank manager. If it is an authorized person then they have to enter the password and account number if it get matches then they have to enter the amount for withdrawal. In this proposed system we have added a feature that the amount limit is extended upto 10000 which is more than the actual limit of 4000. To provide more security and make the system user friendly we are using Haar Cascade Algorithm and Face landmark algorithm .In this face and iris recognition of an authorized person will be stored in data base. We trained the model using positive images and negative images where the positive image is the actual image of the authorized person and their features whereas negative image doesn't contain any features of positive image and it is totally opposite to the positive image. Face land mark algorithm plots the point on the faces of the person which then calculate the distance and compare the distance of the points with captured image.

### **6. ADVANTAGES**

The most advantage of this project is to protect our account in secure manage. Images trained in this process will require less amount of time. Algorithm used in this method are very easy to understand and easy to implement.Cost of this project will be less in amount and can be easy implemented as a real time.

### **7. BLOCK DIAGRAM**



## 8. MODULE

**Login Module:** In this module a welcome page will be displayed and then an user have to enter their account number and password. If the account number and password get wrong they have changes to re-enter their password. If they fail to enter correct account number and password they cannot withdraw their amount. The Login Module is a portal module that allows users to type a user name and password to log in. You can add this module on any module tab to allow users to log in to the system. More on creating module tabs. Logging out may be performed explicitly by the user taking some actions, such as entering the appropriate command and clicking a website link label as such. It can also be done implicitly, such as by the user powering off his or her workstation, closing a web browser window, leaving a website, or not refreshing a website within a defined period.

**Image Pre-processing module:** Pre-processing is a common name for operations with images at the lowest level of abstraction - both input and output are intensity images. These iconic images are of the same kind as the original data captured by the sensor, with an intensity image usually represented by a matrix of image function values (brightness's). The aim of pre-processing is an improvement of the image data that suppresses unwilling distortions or enhances some image features important for further processing, although geometric transformations of images (e.g. rotation, scaling, translation) are classified among pre-processing methods here since similar techniques are used. Image pre-processing methods are classified into four categories according to the size of the pixel neighborhood that is used for the calculation of a new pixel brightness, deals with pixel brightness transformations, describes geometric transformations, considers preprocessing methods that use a local neighborhood of the processed pixel and briefly characterizes image restoration that requires knowledge about the entire image.

**Segmentation Module:** Image segmentation is a method in which a digital image is broken down into various subgroups called Image segments which helps in reducing the complexity of the image to make further processing or analysis of the image simpler. Segmentation in easy words is assigning labels to pixels. All picture elements or pixels

## 9. SYSTEM FUCTION

**Face Features:** The below image is an example of a Dlib's 68 points model. There we can see those points from 1 to 68. But sometimes we don't need all 68 feature points, then for that, we will do in the next post, how we can customize those points according to our requirements. In this post, we only going to see about 68 Dlib does points for clear understand.

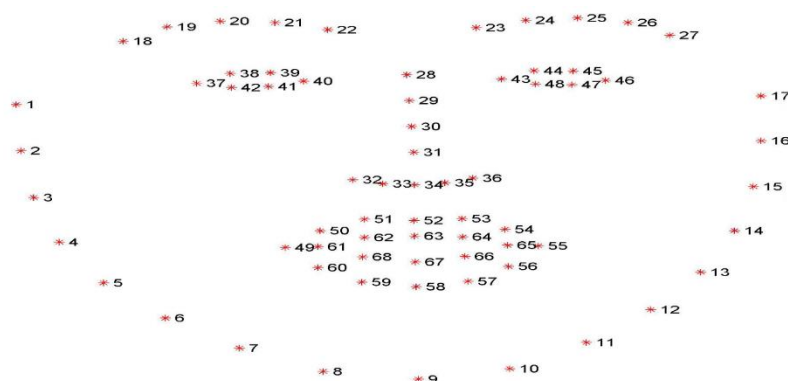


FIGURE 1. dlib68 face marks

**Haar cascade Algorithm:** The algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then it is required to extract features from it. Features are nothing but numerical information extracted from the images that can be used to distinguish one image from another; for example, histogram (distribution of intensity values) is one of the features that can be used to define several characteristics of an image even without looking at the image, such as dark or bright image, the intensity range of the image, contrast, and so on. Using Haar features is a efficient method for face detection. These features are just like the convolution kernel. The convolution can be summarized by locating a from the image, then crop out a sub-image with the selected as the center from the source image with the same size as the convolution kernel. Calculate an element-wise product between the values of the kernel and sub- image. Each feature is a single value obtained by subtracting the sum of the algorithm needs a lot of positive images (images of faces) and negative im- ages (images without faces) to train the classifier. Then it is required to extract features from it. Features are nothing but numerical information extracted from the images that can be used to distinguish one image from another; for example, histogram (distribution of intensity values) is one of the features that can be used to define several characteristics of an image even without looking at the image, such as dark or bright image, the intensity range of the image, contrast, and so on. Using Haar features is a efficient method for face detection. These features are just like the convolution kernel. the center from the source image with the same size as the convolution kernel. Calculate an element-wise product between the values of the kernel and sub- image. Add the result of the product. Each feature is a single value obtained by subtracting the sum of the Webxels under the black rectangle from the sum of the Webxels under the white rectangle. Now, all possible sizes and locations of each kernel are used to calculate plenty of features. Each feature calculation, requires to find the sum of the Webxels under the white and black rectangles. The concept of integral image is very useful to solve this.



FIGURE 2. Haar Cascade

**Face Regonition:** Face recognition is an easy task for humans. Face recognition based on the geo- metric features of face is probably the most intuitive approach to face recognition. One of the first automated face recognition systems was marker points (position of eyes, ears, nose etc.) were used to build a feature vector (distance between the points, angle between them etc). The recognition was performed by calculating the euclidean distance between feature vectors of a probe and reference image. Some of the latest work on geometric face recognition was, a 22-dimensional feature vector and experiments on large datasets have shown that geometrical features alone may not carry enough information for face recognition.

**Image Normalization:** Once the iris region is segmented, the next stage is to normalize this part, to enable generation of the iris code and their comparisons. Since variations in the eye, like optical size of the iris, position of pupil in the iris, and the iris orientation change person to person, it is required to normalize the iris image, so that the representation is common to all, with similar dimensions. Normalization process involves unwrapping the iris and converting it into

its polar equivalent. It is done using Daugman’s Rubber sheet model. The center of the pupil is considered as the reference point and a Remapping formula is used to convert the points on the Cartesian scale to the polar scale.

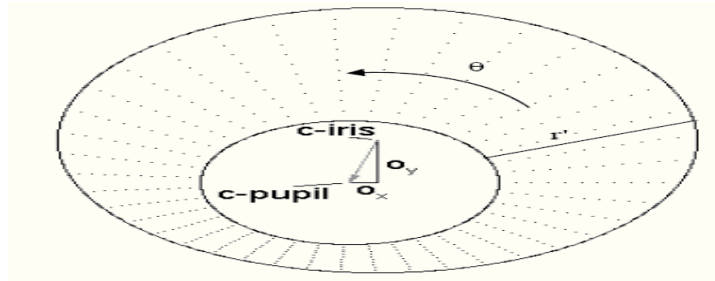


FIGURE 3. Normalization process

$$r' = \sqrt{\alpha\beta} \pm \sqrt{\alpha\beta^2 - \alpha - r_1^2}$$

Where r1 = iris radius

$$\alpha = o_x^2 + o_y^2$$

$$\beta = \cos\left(\pi - \arctan\left(\frac{o_y}{o_x}\right) - \theta\right)$$

The radial resolution was set to 100 and the angular resolution to 2400 pixels. For every pixel in the iris, an equivalent position is found out on polar axes. The normalized image was then interpolated into the size of the original image, by using the interp2 function. The parts in the normalized image which yield a NaN, are divided by the sum to get a normalized value.

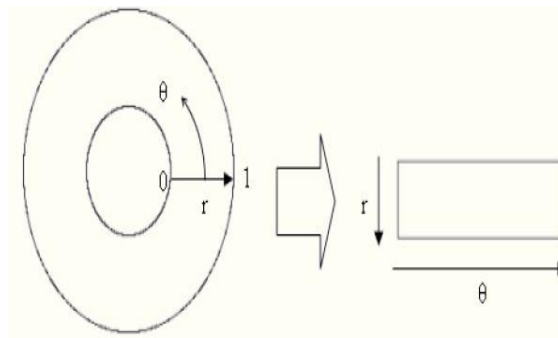


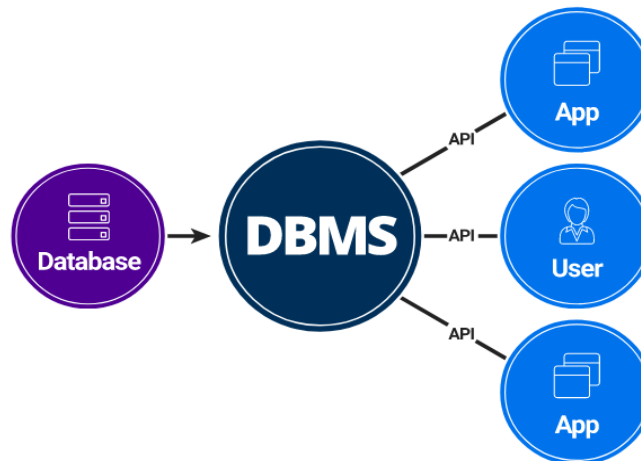
FIGURE 4. Unwrapping the process

**Data Base Management System:** Database Management Systems (DBMS) are software systems used to store, retrieve, and run queries on data. A DBMS serves as an interface between an end-user and a database, allowing users to create, read, update, and delete data in the database. The DBMS manages incoming data, organizes it, and provides ways for the data to be modified or extracted by users or other programs. Some DBMS examples include MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBase, Clipper, and FoxPro.

- Hierarchical Database Systems.
- Network Database Systems.

- Object-Oriented Database Systems.

A database management system (DBMS) is a software tool that enables users to manage a database easily. It allows users to access and interact with the underlying data in the database. These actions can range from simply querying data to defining database schemas that fundamentally affect the database structure. A database management system (DBMS) solves these problems with software that permits centralization of data and data management so that businesses have a single, consistent source for all their data needs. Using a DBMS minimizes redundant and inconsistent files. Oracle makes software, called database management systems (DBMS), to create and manage databases. An RDBMS is a relational database management system. An Oracle Database (aka Oracle RDBMS) is a collection of data organized by type with relationships being maintained between the different types. Databases are used for storing, maintaining and accessing any sort of data. They collect information on people, places or things. That information is gathered in one place so that it can be observed and analyzed. Databases can be thought of as an organized collection of information. A database is an organized collection of structured information, or data, typically stored electronically in a computer system. ... Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just database. Database users are the ones who really use and take the benefits of the database. They directly interact with the database by means of a query language like SQL. ... These users will be scientists, engineers, analysts who thoroughly study SQL and DBMS to apply the concepts in their requirements. Databases are used just about everywhere including banks, retail, websites and warehouses. Banks use databases to keep track of customer accounts, balances and deposits. Retail stores can use databases to store prices, customer information, sales information and quantity on hand. Database Management Systems (DBMS) are software systems used to store, retrieve, and run queries on data. A DBMS serves as an interface between an end-user and a database, allowing users to create, read, update, and delete data in the database. A database management system (or DBMS) is essentially nothing more than a computerized data-keeping system. Users of the system are given facilities to perform several kinds of operations on such a system for either manipulation of the data in the database or the management of the database structure itself.



**FIGURE 5.** Data Base Management System

**Open cv:** Open CV (Open Source Computer Vision Library) is released under a BSD license and hence it's free for both academic and commercial use. It has C++, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android. OpenCV was designed for computational efficiency and with a strong focus on real-time applications. Written in optimized C/C++, the library can take advantage of multi-core processing. Enabled with OpenCL, it can take advantage of the hardware acceleration of the underlying heterogeneous compute platform.

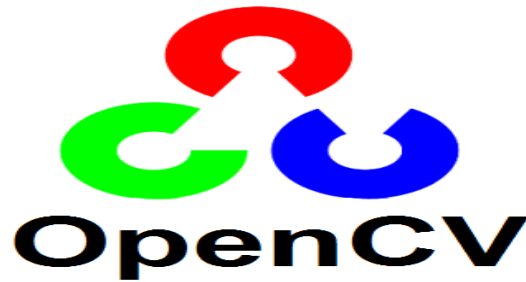


FIGURE 6. open CV

**SMTP Protocol:**

The SMTP model is of two types:

- 1.End-to- end method
- 2.Store-and- forward method

The end-to-end model is used to communicate between different organizations whereas the store and forward method are used within an organization. A SMTP client who wants to send the mail will contact the destination's host SMTP directly in order to send the mail to the destination. The SMTP server will keep the mail to itself until it is successfully copied to the receiver's SMTP. The client SMTP is the one which initiates the session let us call it as the client- SMTP and the server SMTP is the one which responds to the session request and let us call it as receiver-SMTP. The client- SMTP will start the session and the receiver-SMTP will respond to the request.

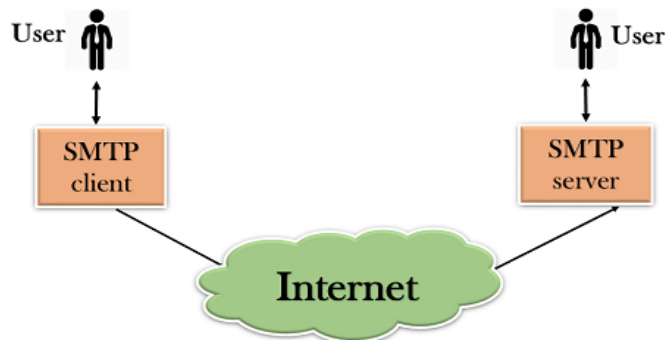


FIGURE 7. SMTP Protocol

## 10. RESULTS

This project helps to secure the transaction and withdrawal of money in the ATM system. Here we use the face and iris recognition which is consider to be the most reliable and secure one. The main two algorithms are Haar cascade where it converts the lower dimensional image to the higher dimensional image, this reduces the fraudulent. The second algorithm is the Face landmark algorithm which is used to compare the high dimensional images by locating the points and finding out the distances between them. This system ensures that it provides high security and make the process very easier.



```

image = cv2.imread('person1.jfif')
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
gray = cv2.GaussianBlur(gray, (7, 7), 0)

edged = cv2.Canny(gray, 50, 100)
edged = cv2.dilate(edged, None, iterations=1)
edged = cv2.erode(edged, None, iterations=1)

cv2.imshow("filter ", edged)

cnts = cv2.findContours(edged.copy(), cv2.RETR_EXTERNAL,
                        cv2.CHAIN_APPROX_SIMPLE)
cnts = imutils.grab_contours(cnts)

```



**FIGURE 8.** Face detection

```

, (ptA[1] + ptB[1]) * 0.5)

```

```

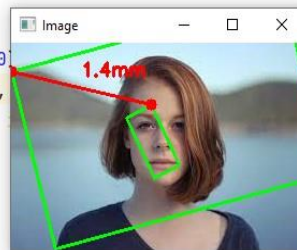
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                        cv2.CHAIN_APPROX_SIMPLE)
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```



**FIGURE 9.** face featuring

## 11. CONCLUSION

Facial and iris recognition has proven to be one of the most secure methods of all biometric systems to a point for high level security and to avoid ATM robberies and provide security for ATM. It replaces the traditional ATM system. It has advantages such as saves manufacturing cost of cards and overcomes drawbacks of the traditional system like carrying the ATM card, losing of card, fraud calls related to ATM card, etc. With new improved techniques in the field of artificial Intelligence that help eliminate more disturbances and distortions, the rate of effectiveness of the system can be improved.

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