

# ENHANCED SECURITY BASED NEW GENERATION ATM WITH MACHINE LEARNING TECHNIQUE

Elakkiya.U<sup>1</sup>, Assistant Professor, Department of Information Technology, Hindusthan Institute of Technology, Coimbatore.

Almas.N<sup>2</sup>, Brijin sam. S<sup>3</sup>, Ramya.V<sup>4</sup>, Tamilselvan.M<sup>5</sup>, Department of Information Technology, Hindusthan Institute of Technology, Coimbatore.

## ABSTRACT

*Face recognition based Automated Teller Machine (ATM) has been convenient approach than ever before for accessing bank's account from anywhere anytime. Being an electronic telecommunication device, it helps customer to perform transactions withdraw cash, make deposits & transfer funds by simply touching few buttons on screen without need for a cashier or bank teller. Face recognition is the trending technology for the purpose of authentication of the person for particular applications. It has wide range of applications such as banking access control, human computer interaction, information security, database retrieval, virtual reality etc. In proposed system face recognition system based on Principal Component Analysis is implemented. In this system, face gets recognized after feature extraction and principal component analysis. System sends notification email to the customers configured mail id when transaction is initiated. This is the new way intimating the transaction to the person. The result is improving the ATM system that will be a defending the approach in coming year and will escalate the confidence of customers in banking sector. Security approaches of ATM have been focused on, and has been improved using face recognition-based authentication technique. One of the main motives is to diminish and tranquillize the effects of attacks to ATM by use of face recognition.*

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## I. INTRODUCTION

Rapid development in science and technology, innovations are being built-up and this has made a positive impact overall, but various financial institutions are still subjected to thefts and frauds. ATM terminals are designed to facilitate easier withdrawal of money for the customers. ATM establishes the stability of the infrastructure in great deal because of their number of bank transactions. Due to their availability and general user friendliness ATMs have become very popular with general Public. There are two types of ATMs: one is used for cash withdrawal and to get the receipt of account balance and another one is for deposits and money transfer. ATM provides PIN (Personal Identification Number) to all its users with the help of which they can access their account. To carry out consumers ATM financial transactions and/or banking functions at any time ATMs are available on a continuous basis. Since the transaction is mostly dependent on PIN-based verification several usability factors have been studied to enhance the security for authentication of users at ATM. Socio-physical factors such as, queue length distractions length of time for the interaction, urgency physical hindrance, memorization of PINs, co-located user display, speed of interaction, and the environment are all determinants of the insecure for the procedure. The major concerns from all of these factors are correlated to detect fraudulent card transactions. Here we propose face recognition to reduce the frauds during transactions in an ATM.

## II. LITERATURE SURVEY

Aru.O et al [1] "**Facial Verification Technology for Use in ATM Transactions**", in American Journal of Engineering Research (AJER), [Online] 2013, pp.188-193. This research looked into the development of a system that integrates facial recognition technology into the identity verification process used in ATMs. The development of such a system would serve to protect consumers and financial institutions alike from intruders and identity

thieves. This paper proposes an automatic teller machine security model that would combine a physical access card, a PIN, and electronic facial recognition that will go as far as withholding the fraudster's card. However, it obvious that man's biometric features cannot be replicated, this proposal will go a long way to solve the problem of Account safety making it possible for the actual account owner alone have access to his account.

Sasipriya, S, et al [2] **"Global ATM reconciliation error codes mapping for all OEM manufacturers with common codes for rectification and reconciliation"**, International Journal of Advanced Research in Engineering and Technology, 11(1), pp. 52-60, Jan.2020. The Automated Teller Machine has transformed into an imperative bit of our general public. Utilizing the ATM anyway can frequently be a baffling encounter because of inclined glitches that happens in the machine. ATM makers have exhibited a few diverse mistake codes which starting at yet have not increased standard acknowledgment. This paper examines the different error codes thrown by various ATM machines produced by different manufacturers can be given a common code for very similar malfunctions made by the machine. Thereby to justify these common codes could gain worldwide acceptance with the usage of the machines.

LaurenzWilskott, et al [3], **"Face Recognition by Elastic Bunch Graph Matching"**., Chapter 11, pp,355-396, (1999) ISBN 0- 8493-2055-0, The recognizing human faces from single images out of a large database containing one image per person. Faces are represented by labeled graphs, based on a Gabor wavelet transform. Image graphs of new faces are extracted by an elastic graph matching process and can be compared by a simple similarity function. The system differs from the preceding one (Lades et al., 1993) in three respects. Phase information is used for accurate node positioning. Object-adapted graphs are used to handle large rotations in depth. Image graph extraction is based on a novel data structure, the bunch graph, which is constructed from a small get of sample image graphs.

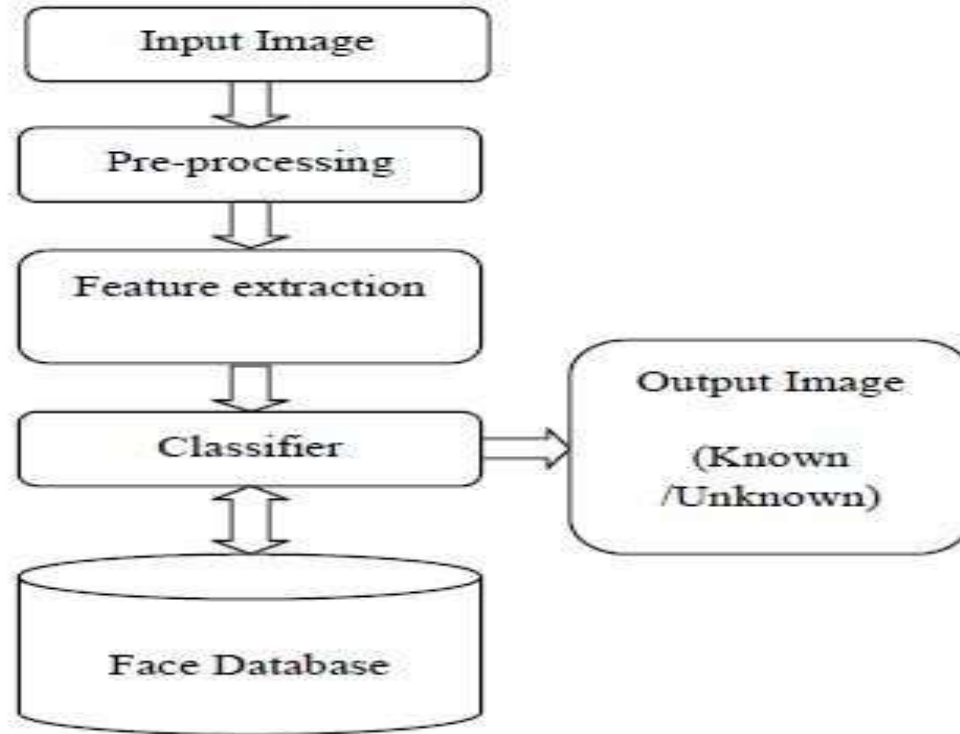
### III. EXISTING METHOD

Existing ATMs are convenient and easy to use for most consumers. Existing ATMs typically provide instructions on an ATM display screen that are read by a user to provide for interactive operation of the ATM. Having read the display screen instructions, a user is able to use and operate the ATM via data and information entered on a keypad. However, the drawback in the existing system is that the user should carry their ATM card without fail. But in many cases, we forget it. So only we designed a system which helps us to use the ATM machine without the ATM card.

### IV. PROPOSED SYSTEM

Face Recognition is a biometric scan technology. Face Recognition includes face scan system that can range from a high-resolution camera, workstations, software and back-end processors. Face scan technology is used to analyze and capture facial characteristics such as distance between eyes, mouth or nose, and face cut of person. The ATM system will consist of embedded camera in machine that will recognize the face standing about 2 feet far in front of system and perform matches against the facial database. The system will usually come to a decision in less than 5 seconds. It is very important that the face is at proper distance from camera or system, at proper angle and lighting is appropriate, otherwise distance from camera will reduce facial size and thus resolution of image. Facial-scan technology has unique advantage, over all other biometrics in the area of surviving large groups. In proposed system we have implemented face recognition algorithm based on principal component analysis. First, we have created the data base of the face images in which extract features of these stored images which a recognition takes place. We extract color and shape of the eyes, nose etc. Then, we capture image which we need to recognize. Perform pre-processing of the image like noise removal RGB to Gray conversion of image. Then, perform feature extraction of the desired face image. Then, apply Principal Component Analysis which recognize and gives decision as person is authorized creates one time password and send it to mobile number of the registered person, if the person enters valid pin number person gets transaction mail. This helps the customers to keep track of the transaction and when transaction is initiated the microcontroller receives the signal and opens the relay to start the motor to initiate the money transfer. This system improvises the safety and authentication quality is improved and more secure transaction will be processed.

## V.IMPLEMENTATION



The image of human face is given as input image as an input where the particular image is pre-processed. The image extracts the useful features of the image which are then normalized to improve the recognition of the system. The output of the feature extraction act as input to the classifier which is used to compare the input face image with featured data of the face that act like a pattern to verify the face. When the face of the particular person matches with the already stored images of the users in the face database it gets activated and the user can withdraw the amount from the ATM.

### MODULE 1:

#### Acquisition

This is the entry point of the face recognition process. The user gives the face image as the input to face recognition system in this module.

#### Pre-Processing

In this module the images are normalized to improve the recognition of the system. The pre-processing steps implemented are as follows

- Image size normalization
- Background removal
- Translation and rotational normalizations
- Illumination normalization

#### Feature Extraction

After the pre-processing the normalized face image is given as input to the feature extraction module to find the key features that will be used for classification. The module composes a feature vector that is well enough to represent the face image.

### **Classification**

With the help of a pattern classifier, the extracted features of face image are compared with the ones stored in the face database. The face image is then classified as either known or unknown.

### **Database**

It is used to match the test image with the train images stored in a database. If the face is recognized as unknown, face images can then be added to the database for further comparisons.

## **MODULE 2:**

### **FACE RECOGNITION SYSTEM:**

Generic system of face recognition is shown in figure1. First stage is data acquisition. We get input image. We create database of the images. Face images are collected from different sources. These sources include camera or data collected from the website. After we get images, we need to do the pre-processing of the images obtained as it affects the performance of the face recognition system due to changes in the background illumination condition, lighting conditions, camera distance which leads to change in the orientation of the image. We perform feature extraction on the pre-processed image and then apply classifier in order to perform recognition of the face based on the features.

### **HAAR CASCADE ALGORITHM:**

Haar Cascade algorithm is a deep learning-based approach for face detection. Face detection is made possible by training a cascade function from a lot of positive and negative images.

Three stages in Haar Cascade algorithm which includes:

- ✓ Haar Feature Selection
- ✓ Creating Integral Images
- ✓ Cascading Classifiers

When an image is captured by the camera, the first step is to extract the features in the image. Suppose, let us take an image with 8x8 pixels we can able to extract 160000+ features in single image. Since face detection is not possible with features with the single image, the second step is to train the system with lot of positive and negative images. From each image features are selected with some threshold value and all the features are added which is further used for detection. At this the 160000+ features get lowered to 6000 features. The next step is the face detection, Since, comparing the captured image with 6000 features is also tedious, divide the features into cascading classifiers where a small portion of feature is compared with the captured image. If any of the feature selected is not matched with the captured image, the image is not detected.

**MODULE 3:****HARDWARE****Esp8266:**

An ESP8266 is a microcontroller, low power highly –integrated Wi-Fi solution a minimum external 7 components. Smart security devices including surveillance cameras and smart lock, this is the manufactured by Espressif which comes unshielded and needs to be soldered onto a module. These are the surface-mountable modules that contain chip, which are ready to be mounted onto an MCU, produced by Espressif, AI-Thinker and certain other manufactures. They are usually shielded and pre-approved by the FCC for use. This means they are good option for device manufacturers looking for scale production.

**RELAY:**

Relay are electric switches that use electromagnetism to convert small electrical stimuli into larger currents, commonly refers to the act of taking information and passing it to another location. A relay is a device with a low power source that powers electromagnetic switch to control (turn ON and OFF) A relay controller is a device that is used **to control a bank of switches**. A relay controller works by turning on and off magnetic coils under logic control. A computer-controlled relay driver allows your computer to send simple commands to activate a switch or a group of switches

**DC MOTOR:**

A direct current (DC) motor is a type of electric machine that converts electrical energy into mechanical energy. DC motors take electrical power through direct current, and convert this energy into mechanical rotation. In our project if the transaction is proceeding the motor will run or else it does not run.

**VI.RESULT**

**Step 1: Welcome page (Face recognition)**



**Step 2: choosing a bank account**



**Step 3: Enter the amount**

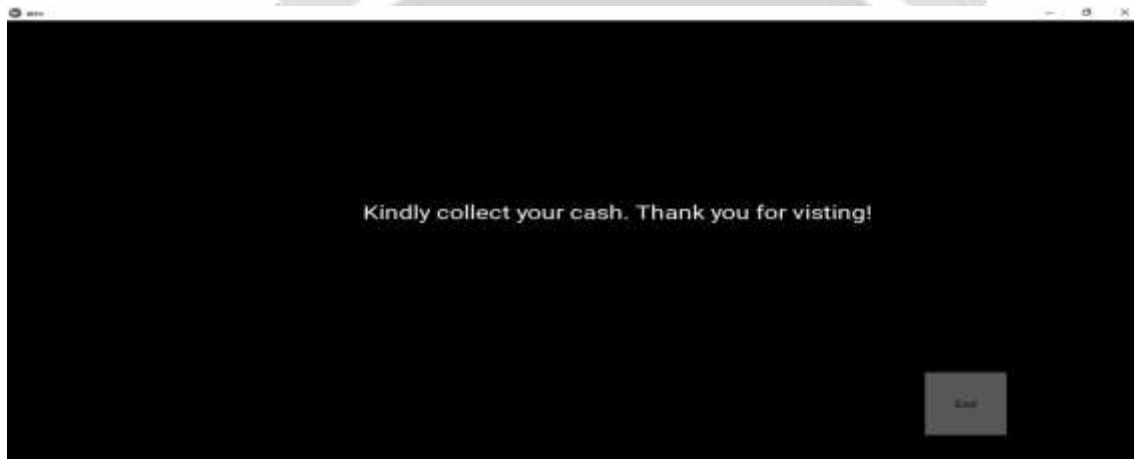


**Step 4: Enter the pin**





**Step 5: Pin is incorrect transaction failed**



**Step 5: Pin number is correct transaction proceed**

## VII. CONCLUSION

ATM model which provides security by using Facial verification software adding up facial recognition systems to the identity confirmation process used in ATMs can reduce forced transactions to a great extent and provide hard-secure authentication. As facial recognition technique seems more challenging as compared to other biometrics, thus more efficient algorithm can be developed. The inability to detect face when beard and aging can be rectified and eliminated or reduced. Instead of face recognition retinal or iris recognition can be used if the cost is reduced

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