Advance ATM Security using Raspberry Pi

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Abstract— The main objective of this system is to develop an embedded system, which is used for ATM security applications. In these systems, Bankers will collect the customer finger prints and mobile number while opening the accounts then customer only access ATM machine. The working of these ATM machine is when customer place finger on the finger print module when authorized customer access ATM successfully. This system will provide three way securities such as finger print, pin code and using QR code scanning technology by using camera. When unknown person want accesses the ATM then this system generates message to the mobile of the authorized customer through GSM modem connected to the Arduino Nano microcontroller.

Key words: OTP, Fingerprint, Password, QR Scanner, Mobile Number, Raspberry Pi

I. INTRODUCTION

Now-a-days, in the self-service banking system has got extensive popularization with the characteristic offering high-quality 24 hours service for customer. Using the ATM (Automatic Teller Machine) which provides customers with the convenient banknote trading is very common. However, the financial crime case rises repeatedly in recent years a lot of criminals tamper with the ATM terminal and steal user's credit card and password by illegal means. Once user's bank card is lost and the password is stolen, the criminal will draw all cash in the shortest time, which will bring enormous financial losses to customer. How to carry on the valid identity to the customer becomes the focus in current financial circle. Traditional ATM systems authenticate generally by using the credit card and the password, the method has some defects. Using credit card and password cannot verify the client's identity exactly. In recent years, the algorithm that the fingerprint recognition continuously updated and sending the four digit code by the controller which has offered new verification means for us, the original password authentication method combined with the biometric identification technology verify the clients' identity better and achieve the purpose that use of ATM machines improve the safety effectively.

With the advent of modern technology, there is a drastic increase in fraud. One easy way is ATM fraud which includes fraudulent cash transactions so there is a need to regularly develop consumer favourable systems to deal with these frauds related to ATM transactions may be of several ways viz. Card Trapping, PIN Cracking, Phishing Attack, ATM Malware, ATM hacking. Several biometric authentication methods can be used to minimize such cases which include fingerprints, face, and iris before any transaction through ATM. A better approach is fingerprint authentication along with ATM pin. It is cost effective and user friendly method since all the required data is already available in the database of the banker.

In this system, customer needs to enter Adhar card instead of the ATM card. After Adhar reorganization, the all bank ATM list will displayed which are linked with the same Adhar card, then customer need to choose the option from which bank they want to transact. Then fingerprint will be scan by using fingerprint module. Then transaction will proceed. Also pincode will be used to accesses ATM. This is three way of security will provided in this project. Our system should discuss the Section II is literature survey, Section III give the proposed system of project. Finally, Section IV and V give the result and conclusion.

II. LITERATURE SURVEY

The main objective of this system is to develop a system, which is used for ATM security applications. In these systems, Bankers will collect the customer finger prints and mobile number while opening the accounts then customer only access ATM machine. The working of these ATM machine is when customer place finger on the finger print module when it access automatically generates every time different 4-digit code as a message to the mobile of the authorized customer through GSM modem connected to the microcontroller. The code received by the customer should be entered by pressing the keys on the screen. After entering it checks whether it is a valid one or not and allows the customer further access [1].

The main objective of this system is to propose a system, which is used for ATM security applications. Here Bankers will collect the customer finger prints and mobile number while opening the accounts then customer can access the ATM machine. When the customer enters ATM and after inserting card he must place finger on the finger print module then he get automatically generated 4-digit code every time as a message to the mobile of the authorized customer through GSM modem connected to the microcontroller [2].
The growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use personal identification numbers (PIN's) for identification and security clearances. Conventional method of identification based on possession of ID cards or exclusive knowledge like a social security number or a password are not all together reliable. An embedded fingerprint biometric authentication scheme for automated teller machine (ATM) banking systems is proposed in this paper. In this scheme, a fingerprint biometric technique is fused with the ATM for person authentication to ameliorate the security level [3].

This paper deals with the solutions related to the ATM security. They are going to make use of fingerprint or One Time Password (OTP) verification along with the use of ATM pin. In this system, the user can have third party authentication either temporary or permanent. In the whole process, the first party i.e. the banker will maintain a database of the customer including fingerprint and mobile number. The banker will provide the ATM card along with its PIN. For the transaction after entering the ATM pin, the customer will be asked to choose an option either fingerprint or OTP

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verification. The OTP will be sent to the registered mobile number of the customer through GSM module connected to the system. After authorized verification, the customer will be able to proceed for transaction else after three successive wrong attempts, the ATM card will be blocked for 24 hours and a message will be sent to the registered mobile number [4].

III. PROPOSED METHODOLOGY

In this project we analyzing what is the problem faced in existing technology this project deals with prevention of ATM theft from robberies to overcome the drawback founding in existing technology in our society. In our project whenever robbery occurs vibration sensor is used here which senses vibration produce from ATM machine and alarm sound produce with the help of GSM message is sent to the bank manager and nearby police station. In existing system is providing three way securities to user such as finger print, pin code and QR scanner system as a camera. User wants to select one option out of these three options. Now recently there is not the system of fingerprint so i.e. is the advanced in our project. In case of people transaction can be done with the help of their finger print that means not need to remember password of ATM card and with the help of QR scanner (camera) Adhar card is scan and transaction can be done.

A. Block Diagram

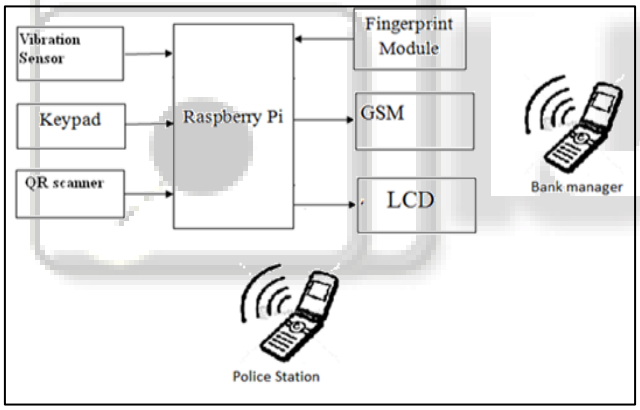

Fig. 1: Block Diagram of Proposed system

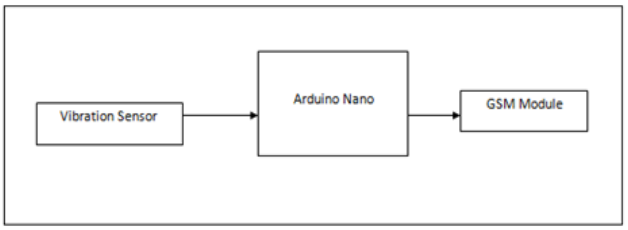

Fig. 2: Block Diagram of system to alert to Bank manager and police

B. Elements of Block Diagram:

1) Raspberry Pi:

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

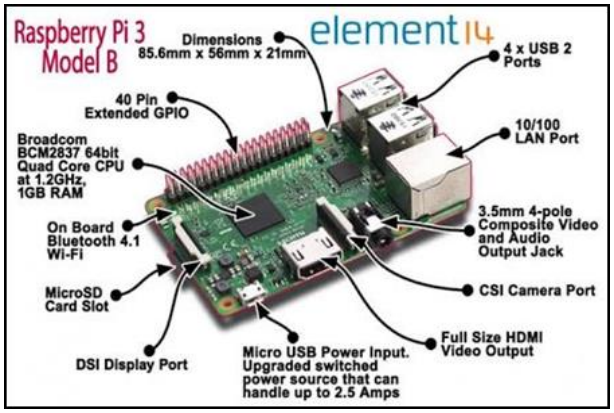

Fig. 3: Raspberry pi 3 Model B

An SD card inserted into the slot on the board acts as the hard drive for the Raspberry Pi. It is powered by USB and the video output can be hooked up to a traditional RCA TV set, a more modern monitor, or even a TV using the HDMI port. It's capable of doing everything expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.The Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras. We want to see the Raspberry Pi being used by kids all over the world to learn to program and understand how computers work.

2) Fingerprint Module:

This is an optical biometric fingerprint sensor (R305). Biometric identification from print made by an impression of ridges in the skin of finger.

3) Keypad:

A keypad is a set of buttons arranged in a block or "pad" which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a numeric keypad. Numeric keypads are found on alphanumeric keyboards and on other devices which require mainly numeric input such as calculators, push-button telephones, vending machines, ATMs, Point of Sale devices, combination locks, and digital door locks.

4) GSM Module:

GSM (Global System for Mobile communication) is a digital mobile telephony system. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA).

5) Arduino Nano:

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

6) Camera:

A web-cam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and emailed as an attachment.

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7) Vibration Sensor:
The SW18010P, SW18015P, SW18020P, etc Vibration sensors are effectively just a delicate spring with a sturdy piece of metal in the middle. When moved, the spring wobbles around and touches the metal, momentarily making contact. These are very useful little devices as they draw absolutely no power.

8) RF Reader:
RFID systems are closely related to the smart cards. Like smart card systems, data is stored on an electronic data-carrying device the transponder. However, unlike the smart card, the power supply to the data-carrying device and thereade3r are achieved without the use of galvanic contacts, using instead magnetic or electromagnetic fields. A radio-frequency identification system uses tags, or labels attached to the objects to be identified.

IV. RESULT

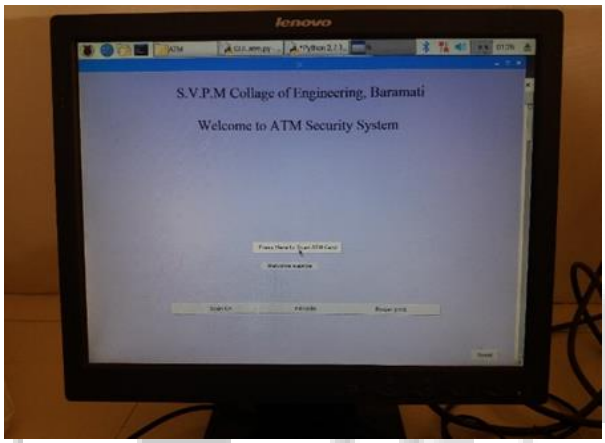

Fig. 4: GUI interface for ATM machine.

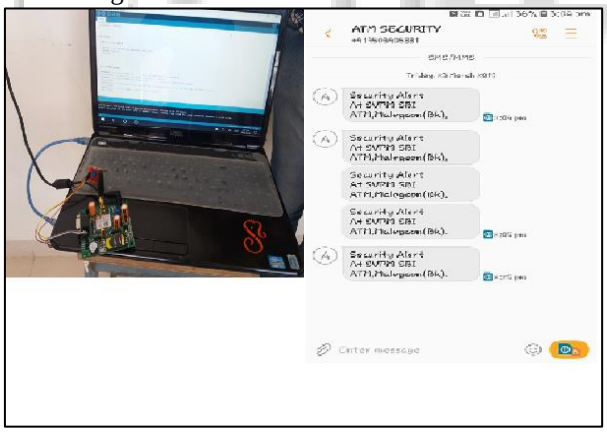

Fig 5: SMS alert send to Banker

V. CONCLUSION

The method used in this paper is of significant use. As a result of the work proposed there will be benefit to human beings for the purpose of ATM security. As a result of this project, there will be tremendous change in ATM security system. As the research work in this area is still going on, we can expect a better outcome through our project than previous existing ones. Additional, our system provides three way securities when customer wants to do transition. In our project 3options are available to user out of three one can be used by user, if user is authorized then ATM is accessed. The security features were enhanced largely for the stability and reliability of owner recognition. The whole system was built on the fingerprint technology, pin code and QR scanning technique which makes the system more safe, reliable and easy to use.

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