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✉ ijareeie@gmail.com

@ www.ijareeie.com



Smart Card for Banking with A Secured System

¹Goda Vasantha Rao, ²T.Pratheek Sai, ³YVVNSD.Nikhil, ⁴CH.Anil

¹Assistant Professor, Department of Electronics and Communication Engineering, St. Peter's Engineering College, Hyderabad, Telangana, India

^{2,3,4}UG Student, Department of Electronics and Communication Engineering, St. Peter's Engineering College, Hyderabad, Telangana, India

ABSTRACT: In the modern era of banking system, transactions plays a vital role. Currently, every customer has an individual ATM card for each and every bank in which they maintain an account. As a result, managing multiple ATM cards and maintaining the confidentiality of their passwords play a major role. To overcome this difficulty, all bank accounts of the user can be embedded in a single ATM card. So that the user can access multiple bank accounts using a single ATM card by selecting the bank from which they are interested to carry out transactions. ATM security also plays a prominent role in today's world. Hence it is necessary to provide high-level security to the existing system for protection against fraud and other threats. As a result, the framework for user identification and authentication in Automatic Teller Machine (ATMs) using Fingerprint identification will be done. Here an RFID card is used for accessing multiple accounts. The data in RFID card is highly secured by providing Fingerprint identification to the system.

KEYWORDS: Arduino, RFID card, Fingerprint, Authentication, RFID Reader.

I. INTRODUCTION

Automated Teller Machines (ATMs) were first introduced in the 1960s. In India, ATMs came into existence in the year 1987. Since then, the usage of ATMs has drastically increased. As of 2018, there were more than three million ATMs around the world. In today's world, ATMs play an important role. ATMs are regularly used for various purposes like performing banking transactions, cash withdrawals, deposits, and knowing account information.

With the increased usage of ATMs, there is also a high risk of theft. In recent times, the number of ATM frauds has increased rapidly. Hence ATM security plays a major role. In general, a user swipes the ATM card and verifies his identification by entering a Personal Identification Number (PIN). If the PIN entered is incorrect, the user cannot access the card. While entering the PIN there is a possibility that someone might watch it or they may even use other devices for knowing the user's PIN. In order to increase the security of ATMs, this project proposes the idea of incorporating fingerprint identification to the existing ATMs. Fingerprint authentication can be used for validating the user's identity because fingerprints are unique for every individual. Nowadays, Fingerprint identification is widely used in mobile phones, laptops and various other devices for security purposes. Fingerprint authentication is a prominent way of providing high-level protection to the ATM systems. To improve the security in the current ATM system, a system that ensures high security is designed. In order to make transactions the user has to provide fingerprint authentication through fingerprint scanner and select the respective bank using keypad module.

Currently, every user has an individual ATM card for various banks in which they maintain an account. As a result, maintaining multiple ATM cards with confidentiality plays a major role. To overcome this drawback, multiple bank accounts can be embedded into a single ATM card. So, the user can swipe the card and select the bank account from which they want to perform a banking transaction. Hence the difficulty of handling multiple ATM cards can be reduced. This project is implemented using RFID card, RFID reader, Arduino, Fingerprint Sensor, Keypad module and LCD module. Here an RFID card is used for accessing multiple accounts. The RFID reader is designed to create an electromagnetic field that it uses to communicate with the RFID tags. Radio Frequency Identification (RFID) is used in product tracking, toll road payments and identification purposes. The main aim of this project is to make banking transactions through ATM more user-friendly and simpler. The security of the current ATM system can also be increased by providing Fingerprint authentication to it.



II. LITERATURE SURVEY

Muhammad-Bello B.L, Alhassan M.E, Ganiyu, S.O. “An Enhanced ATM Security System using Second-level Authentication” [1]: This paper was published in February 2015. The main motive of this paper is to provide two-level authentication for the existing ATM system. In the first level, a Personal Identification Number (PIN) is used for providing security. Fingerprint identification is used as second-level protection. The limitation of the proposed system in the paper is that it mainly deals with ATM security and multi-account accessing is not used.

Gokul.R, Godwin Rose Samuel.W, Arul.M, Sankari.C “Multi Account Embedded ATM Card” [2]: This paper was published in July 2015. The proposed system in the paper is designed to achieve multi-account access using a single ATM card. As a result, the user can use a single card for operating different bank accounts. The main setback of the proposed paper is that, it only focuses on multi-account accessing.

Archana.D, Aarthi.R, Angelin.A “Secured Smart Card for Multi Banking”[3]: This paper was published in April 2016. The main aim of this paper is to design a smart card that allows users to operate different bank accounts. This project reduces the difficulty of handling multiple ATM cards. This paper only focuses on embedding multiple bank accounts and does not focus security of the ATM system.

Sivaranjani.S, Suganthi.I, Usha.V, Vinitha.M, Smitha Gayathri.D “Multiple Account Access using Single ATM Card” [4]: This paper was proposed in March 2017. The idea behind this paper is to embed multiple bank accounts into a single ATM card. Hence, users can use a single ATM card for accessing multiple accounts. This project is designed using a universal card reader, PIC microcontroller, keypad and LCD. This paper only deals with multiple account access and it does not focus on ATM security.

Lini R “Fingerprint Based ATM System” [5]: This paper was proposed in March 2020. This paper proposes the idea of installing a Fingerprint Sensor on the door in ATM centers. The user has to scan their finger, in order to open the door. If the user identification is valid, the name of the user is displayed on the LCD monitor. After performing the transaction, the door closes within 10 seconds. In case of any theft inside the ATM, the buzzer will be on. This project is implemented using a Fingerprint sensor and Arduino (Atmega328P). The limitation of this paper is that it only focuses on ATM security. Another drawback is that it is always not possible for the user to come out within 10 seconds.

A.Salma, C.Sarada Devi, V.Saranya “Smart Card for Banking with Highly Enhanced Security System”[6]: This paper was published in May 2020. This paper proposes the idea of designing a Universal ATM Card for operating multiple bank accounts. This project also improves the security of the ATM system by incorporating a Fingerprint sensor to the door of ATM Centres. The door opens only after validating the user’s identification. This project is implemented using a Smart card reader, DC motor, RS232 and Buzzer which makes it complex and costlier.

III. PROPOSED SYSTEM

This project is proposed to design a smart card to perform banking transactions in a secured manner. This project deals with two aspects, one is multi-account access using a single ATM card and the other is the security of the ATM system.

Instead of using individual ATM cards for different bank accounts, multiple bank accounts can be embedded into a single ATM card. As a result, the difficulty of handling multiple ATM cards is reduced. For this purpose, a RFID card is used.

To enhance the security of the existing ATM system, fingerprint authentication is introduced. A fingerprint sensor is used for providing fingerprint authentication. The user has to provide Fingerprint Authentication using a fingerprint sensor for validating their identity. This project is implemented using an Arduino, RFID reader, RFID card, keypad, fingerprint sensor and LCD.



BLOCK DIAGRAM:

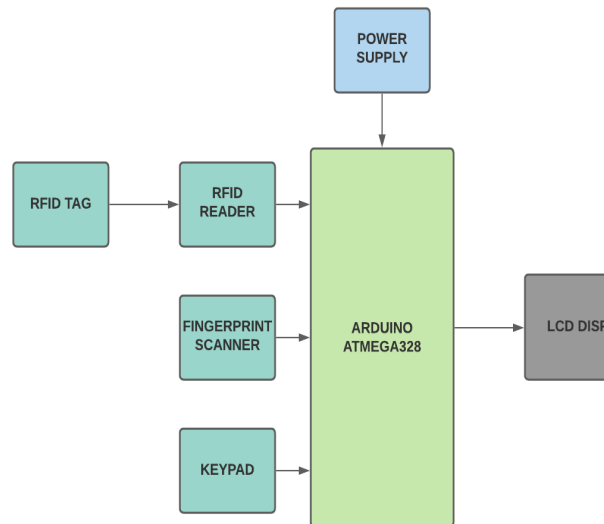


Figure 1: Block diagram of Smart Card for Banking with a Secured System

Arduino (Atmega328P) is the main component for designing the circuit of this project. Arduino connects all the input and output devices. Input devices in the block diagram are RFID card, RFID reader, Fingerprint sensor and keypad module. The output device in the block diagram is LCD module.

Arduino is connected with an RFID reader, fingerprint scanner, keypad (4*4) and an LCD Display (16*2). Here the card is scanned using RFID reader. In order to make transactions the user has to provide fingerprint authentication through fingerprint scanner and select the respective bank using keypad module. Then the data is displayed on the LCD module.

FLOW CHART:

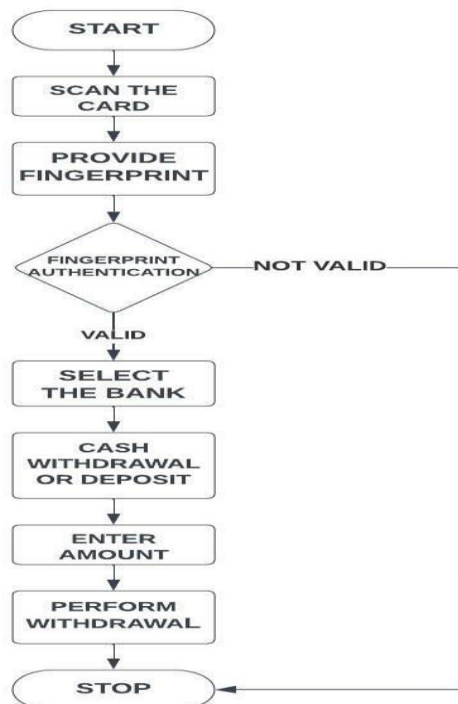
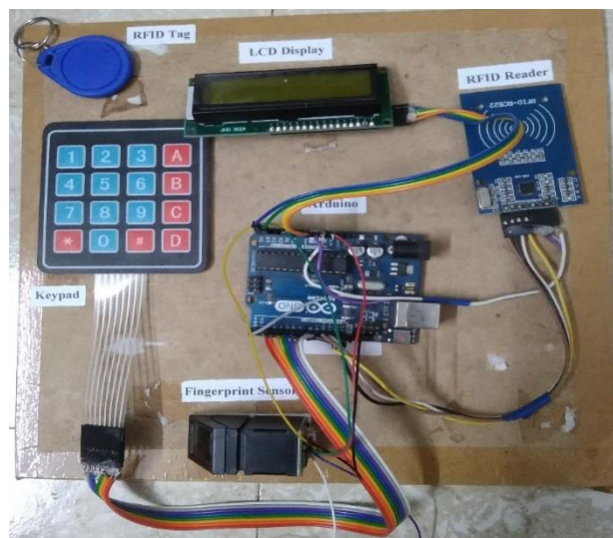


Figure 2: Flow chart of Smart Card for Banking with a Secured System



The Flow chart of this project is very much similar to the ATM Transaction process. First, the user scans the card using RFID Reader, in the next step user has to provide Fingerprint Authentication using Fingerprint Sensor. If Fingerprint Authentication is valid the process continues otherwise the user cannot continue the process. Hence the user can perform banking transactions only after successful validation of their identity. In the next, the user has to select the bank from which they are interested to perform banking transaction. After selecting the bank, the user can perform various tasks like balance enquiry, cash withdrawal and deposit.

IV. RESULTS



The results on LCD will be displayed after scanning the RFID card using RFID Reader. The user has to select the bank using keypad after providing fingerprint authentication using fingerprint sensor. The user can perform any task like balance enquiry or withdrawal or deposit using keypad. In this way, every output will be displayed on LCD as per what the user selects using keypad.

V. CONCLUSION

The main aim of the proposed system is to make banking transactions through ATMs more user-friendly and simpler. This project reduces the complexity of managing multiple ATM cards by embedding different bank accounts into a single ATM card. The user need not have to carry several ATM cards and need not have to remember the separate PIN for every ATM card. ATM security is a major concern that the world is facing nowadays. To increase the security of ATMs, this project proposes the idea of incorporating fingerprint identification to the existing ATMs. Hence banking transactions can be performed easily and in a more secure manner. This project is cost-effective and efficient.

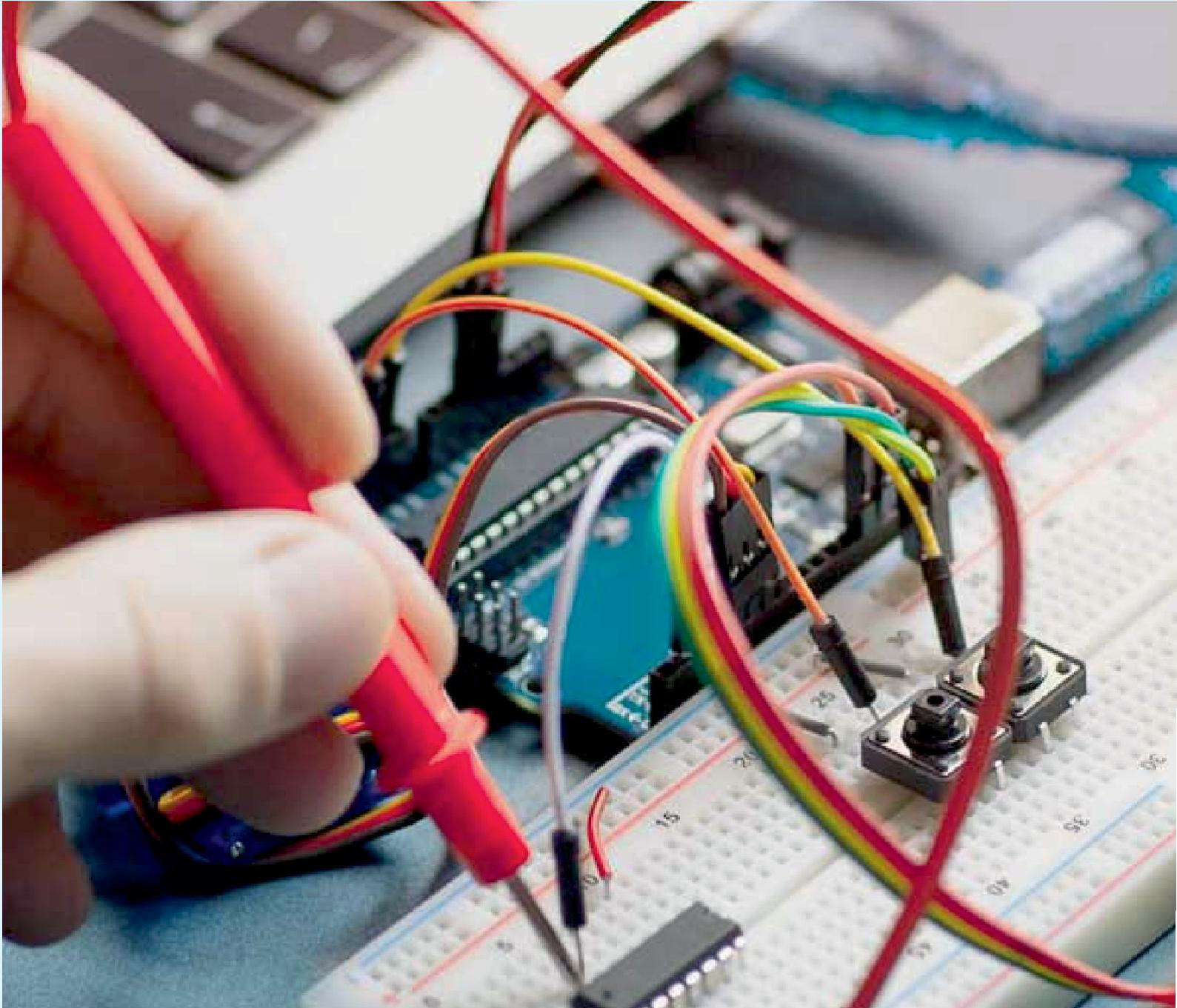
VI. FUTURE SCOPE

This project mainly focuses on two aspects, one is security of existing ATM system and the other is multiple account accessing using single card. Since multiple accounts are accessed using single card, the security of the proposed system can be further improved. This can be done by providing multi-layered security to the system like assigning Personal Identification Number (PIN) to the system along with fingerprint identification. Security of the proposed system can also be enhanced by using Facial Recognition. The other way to improve security of proposed system is by sending One Time Password (OTP) to the user's mobile number which is linked to the respective bank.



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