

Contactless Automated Teller Machine

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Abstract:

Due to Coronavirus pandemic, contact with objects increases the risk of causing infection. So by using contactless methods to withdraw cash from ATM will reduce the risk of causing infection and also improve the speed of Transaction. Traditionally, the ATM has been using a magnetic stripe card for identification of the account holder and the PIN for authorisation. For using contactless ATM, the customer has to use the payment apps to scan a QR code on the screen and enter the amount and Security PIN in his mobile, and collect the cash without touching the machine. Compared with already existing methods the proposed method requires only 25 seconds for completing the transaction. It also eliminates the risk of card skimmed and individual card for every bank is not mandatory, we need only single app to withdraw cash from any ATM. It also provides the same EMV level of security as contact for online authorization.

Keywords –ATM, PIN, OLED, NFC

I. INTRODUCTION

1.1 History of ATM-

The idea of machine dispensing cash comes from Scottish inventor John Shepherd-barron in 1967 while watching a vending machine dispense chocolate bar. Barclays, London bank loved this idea and helped John Shepherd-barron first ATM in branch on Enfield High Street. It uses radioactive inks instead of plastic card and dispense cash maximum up to 10 euro. The first automated banking machine in the U.S. was devised by a Dallas engineer named Donald Wetzel. This ATM uses plastic card instead of radioactive ink. It was installed at September 1969 in Chemical Bank Branch on Long Island.

1.2 Modern ATM –

Modern ATM transactions have become a basic activity in a person's daily life. Several factors such as queue length, distractions, length of time, urgency, physical hindrance, memorization of PINs, co-located user display, speed of interaction, and the environment are all the problems faced by card users. As the card system is ageing, the fraudsters are finding more methods to attack this system. These cards contain magnetic strip which stores the information about the PIN and authentication details. When we insert a Card in ATM it reads all the user information and while entering the amount and Correct PIN it verifies with the Server and dispenses the Cash.

II. EXISTING ATM WITHDRAWAL METHOD

2.1 Cardless ATM Withdrawal Method-

Cardless ATMs provide access to your account and allow you to withdraw cash without the need for a physical card. Cardless ATMs rely on account verification via message or a banking app on your smartphone. It isn't always

convenient to carry a wallet, purse or something else to hold your physical cards. All you need is to grab your smartphone if you're going for a jog or a walk through the neighborhood. If you decide to grab some money on the way home, Cardless ATMs give you that option. It has some cons like Cardless ATM support only individual banking app. Cardless ATMs rely on smartphones to operate. If your bank utilizes an app, your phone has to be compatible with that app or you can't use it.

2.2 NFC Payment Application Method-

Near Field Communication (NFC) technology is based on a short range radio communication channel which enables users to exchange data between devices. With NFC technology, mobile services establish a contactless transaction system to make the payment methods easier for people. Although NFC mobile services have great potential for growth, they have raised several issues which have concerned the researches and prevented the adoption of this technology within societies. It also has some cons like the cost of installing the hardware and software and hiring technicians to maintain it can be difficult. Many mobile hackers have developed ingenious ways of gaining unauthorized access to personal financial data stored on phone.

III. PROPOSED CONTACTLESS AUTOMATED TELLER MACHINE

3.1 Proposed concept on ATM-

The primary Objective of the contactless ATM is to create a contactless ATM using ATmega 328 microcontroller and to interface the GSM module with BHIM server and then with ATmega 328 microcontroller then to create an environment to make transaction which help us to improve the security of transaction and speed of transaction.

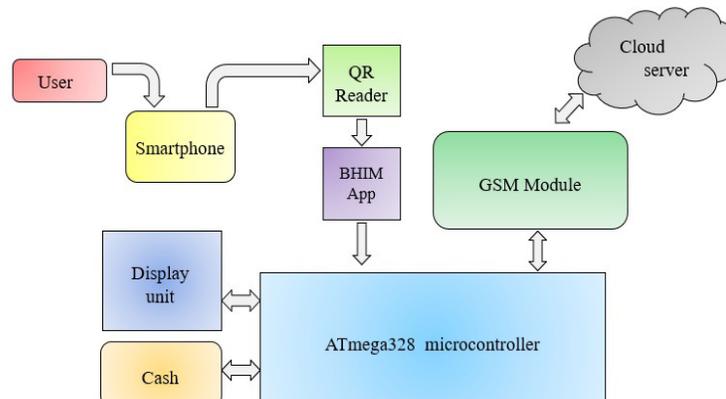


Figure 1. Block diagram of Proposed Method

3.2 Working of Our Proposed Method-

This project is created to make transaction without physical contact with Automated teller machine. User interfacing with ATM machine by using smartphone it consist of interfacing applications. We are scanning the displayed QR using QR scanner application which decodes the Quick Response code into original format. Then using this original format of information is used to redirect us to payments page of BHIM payment application. Here we are using default application as Google Pay for payment process.

OLED display is used for purpose of display QR code image and other transaction details associated with process. A microcontroller is used to communicate with GSM and display. GSM module is used to communicate with cloud server of BHIM and gives the details of transaction. Once transaction is completed further process of cash dispense is indicated using some LEDs. If cash is dispensed by the ATM then green LED glows else led stop glowing.

3.3 Acquisition of Digital Image of QR Code-

- Here we are starting the transaction from a unique BHIM ID, which is obtained as url link.

- In image acquisition process the url link is converted into an quick reader(QR) code from various website like QR generator.
- Where the generated QR code is encoded form of a given url link of a unique BHIM ID of a bank account.

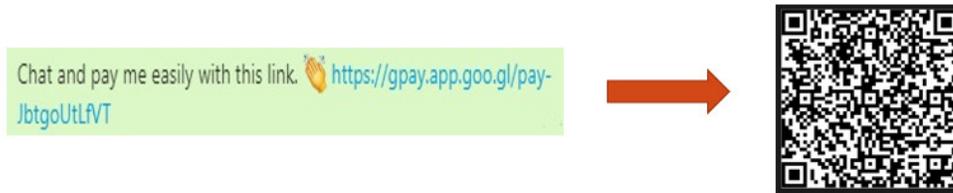


Figure 2. Acquisition of Digital image

3.4 Interfacing QR Scanner and BHIM App-

- In this phase the original QR image had more code complexity that is number of black and white pixels are relatively higher when compared with a monochromatic OLED display.
- So we have generated a simple QR code from a url which is recognized by a QR scanner app.
- This app redirects to the payment page of the selected BHIM application.
- Through this simply generated QR code is indirectly connected with the bank account.
- The QR scanner reads black and white pixels of a QR code and decodes into original format.

3.5 Converting Digital Image into Hex Code-

- In conversion, digital image of a QR code is converted into a hex code format and Bitmap identifier is mentioned.
- With the help of [image2cpp convertor tool](#) which is built of an HTML and JAVASCRIPT codes.

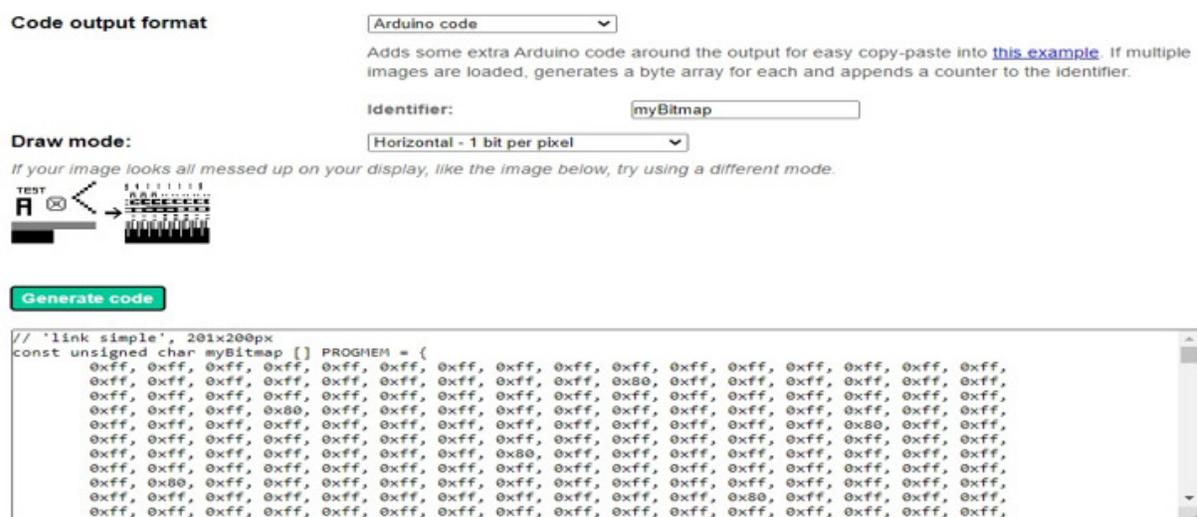


Figure 3. Hex Code conversion

3.6 Interfacing OLED Display with Microcontroller-

- Monochromatic display of 0.96 inch with driver IC SSD1306 is used.
- This display communicate using I2C communication with the help of driver IC.
- Image in Hex code format can be read by driver IC by using Adafruit library which supports hex code bit array of an image.
- This IC supports both binary and hex code format, hence we can display both image as well as text. Some IC's which does not support hex code are not able to display images.

3.7 Establishing Network Connection of SIM Card-

- We are using a 2G network for communication and set baud rate as 9600 per second via serial communication port.
- There is no network connection established when status LED blinks continuously, Then SIM card is connected with network status LED blinks for every 3 seconds.
- For verification if the network is connected properly we can able to make call to GSM module.

3.9 Interfacing Arduino with GSM-

- Using software serial library we assign pin 9 as RX and pin 10 as TX in ATmega 328.
- For serial communication RX pin of Arduino connected with TX pin of GSM module, similarly TX pin of Arduino connected with RX pin of GSM module.
- Common GND and 12 v power supply is connected to the module. While communication GSM module requires more than 5 v for its operation, hence separate power supply is given to GSM.

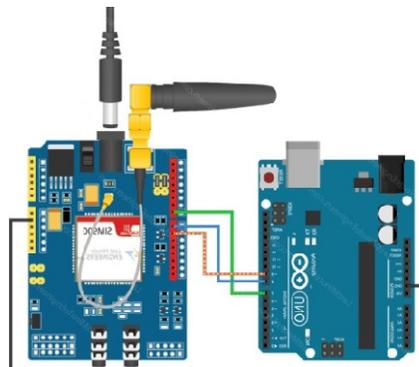


Figure 4. Interfacing of Arduino with GSM

3.10 Incorporate AT commands with previous code-

- AT commands are instructions used to control a modem. AT is the abbreviation of Attention. Every command line starts with "AT" or "at".
- We are using switch case to receive message while the user input is "R" then GSM module is set into receive mode.
- Arduino sent "AT+CNMI=2,2,0,0,0" to receive incoming message by GSM module and print them in serial monitor.

3.11 Displaying the output-

The message from BHIM app can be displayed in serial monitor of Arduino by using GSM module which is connected to the network to receive messages. Later on the messages can be displayed in the OLED display.

3.12 Advantage of the proposed method-

- This method is contactless process of withdraw cash from ATM , Hence it reduces the risk of causing COVID 19 and other diseases which causes due to contact.
- Compared with existing methods the speed of transaction is improved.
- It improve security by adding bio metric fingerprint instead of using for digit UPI pin.
- Theft of ATM card, card skimming, NFC method fraudulent activity and other scamming methods are eliminated.
- You need not to carry individual card for every bank and remembering passwords.Instead, simply use single application to make transaction and bio metric fingerprint for authentication.

IV.CONCLUSION

This days our generation required simple and futuristic technologies for day to day activity and recent times shows that how contactless methods are important for Human being to survive in Globe pandemics. Thus we proposed method of contactless automated teller machine is simple and effective in our current Situation which avoid the spread of Globe pandemic like COVID 19.As of now our proposed method deals only with the withdrawal process of cash from ATM it can be enhanced in future for possibility of both deposit and withdraw cash from ATM without contact and usage of ATM cards are completely eliminated.

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