

DESIGN AN INTERACTIVE ATMS CABIN FOR HELPING BLIND PEOPLE, BY USING SPECIAL EQUIPMENT AND USER INTERFACES.

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Abstract

This work, has proposed the design of ATM's cabinet for the blind, in a way meets their needs and allows them to rely on themselves without the need for any help from their relatives or friends, in spite of there are many ATMs in the world containing their own Braille keyboard devices, but it is quite possible that, the blind Being scammed and theft in many ways, sometimes even from the people closest to them, in addition to this, that many blind people do not know how to read Braille code. Moreover, blind people find it difficult to deal with traditional ATMs.

Keywords: ATM, adapters, blind people, Braille Code, ID card system, PIN code.

1. Introduction

Recently, electronic commerce has spread and transactions through it have become very easy and useful, but there is a group of people who cannot fully benefit from it, they are the blind, who are always subjected to fraud and theft, even from their relatives in many cases. Furthermore many reports refer to the blind people were grown up to 45 million in 2020 [1]. The most important interface for cash and electronic commercial dealings for most people and linking them to banks on the one hand and the rest of the service and commercial institutions are ATMs.

ATM (Automated teller machine) - a software and hardware complex designed for automated issuance and receipt of cash both using payment cards and without, as well as performing other operations, including payment for goods and services, drawing up documents confirming the relevant transactions[2].

Uses in the world: Accurate statistics on the number of ATMs used in the world is not available. However, can be said for every 100,000 adults 41.24 ATMs are available approximately, in 2020 depends on World Bank statistics [3].

Operating principle: The following describes the general principle of operation of the ATM when working with a bank card with a magnetic stripe. The principle of operation with microprocessor cards may differ. After loading the card into the ATM card reader, the cardholder is prompted to enter a secret code (PIN code) to authorize the cardholder. Next, a selection of available operations is offered (when selecting an operation, a PIN code may also be requested; this depends on the specific settings of a particular ATM) [4].

After selecting the operation, the ATM encrypts the information received (the contents of the magnetic stripe/chip, the entered PIN code, the requested operation) and transmits the data to the processing center of the acquiring bank (the bank servicing the ATM). The acquiring bank sends a request to the payment system to carry out the transaction. The payment system routes the request to the issuing bank (the bank that issued the card) and, having received consent or refusal (authorization code), sends commands to the ATM to fulfill or reject the request. At the same time, all actions for sending a request, processing a response to a request, issuing / receiving money from cassettes are recorded, which allows

an investigation if the operation is challenged. Since the PIN code is known only to the cardholder, transactions confirmed by the PIN code are considered to be performed directly by the cardholder [5].

1. Problem Description

There are a lot of blind people cannot work at a normal ATM of their own accord, but thanks to the help of friends or relatives. From the foregoing, the blind cannot deal with the ATM by themselves, even in emergencies, always waiting for other assistance in this regard, not to mention the susceptibility to fraud and theft. Therefore, this work has been proposed to amend the device in a way that meets their needs, to be able to depend on themselves without having to help any person, as a many, as the many other attempts before this work (On the software level or hardware) [6].

2. Computer Program: Validation and Verification

Firstly, we must know the expected basic operations required by the blind, of course, the procedure we follow when using an ATM (deposit, withdraw, transfer). This is part of the ATM, either from the side of the blind. We need to see what can be done for the blind about this machine. Blind these ordinary people, but they have lost their sense of sight, which means they can listen, and they can feel through touch [7]. From this standpoint, the focus will be on the senses they have, namely hearing and touch, as an attempt to solve the problem through this work.

Through the data provided, we can make the necessary adjustments to ATMs, so that other problems do not appear. The proposed modification must be compatible completely with standards in banks and conformity to protocols in banking operations, so as not to become a burden on banks and finances. Institutions are therefore unable to solve this problem. For this reason, two main plug-in parts will be added to the ATM to ensure the success of the work. The first will be hardware and the second will be software.

3. Hardware.

3.1.1. Identification magnetized cards to be given by the bank to blind clients.

A magnetic induction card (ID card system), such as a card used to open doors in universities and schools, must be provided by the bank to the customer (blind), with a PIN number. The card also contains the customer's name, date and serial number and the like things regarding the card the usual written language of the country, in addition to the code (Braille). In addition, Creation of a secret code on the mentioned card (****) to increase the security is written in Braille alphabet. The advantage of this card is to open the cabin when the card is in contact with any part of the door, this is for the client side, but for the system, it creates a pre-session and prepare for the next.

3.1.2. Adapter, for the new adjustment to make the system make as planned for.

The suggested adapter is containing the keyboard and touchpad to meet the needs of the blind clients, this adapter will be compound as a plug-in with the any ATM. Touchpad 6-inch to be enough to enable the customer to enter instructions and used to confirm instructions and operations by the client.

Keypad: used for enter the amount for withdrawing the money, which is written in the language of the country, in addition to the Braille code.

Fingerprint device: This device uses to identify the identity of the client and confirm the session, therefore, allows the client to carry out banking transactions by the system. The figure below shows the suggested adapter.

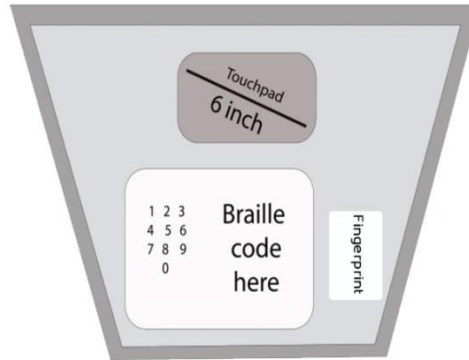


Fig. 1. shows the suggested adapter.

3.1.3. ATM cabin

This cabin includes an ATM inside, it is classified to be part of the hardware to facilitate the description. It consists of a slide gate, the customer area, in addition to the traditional ATM with the mentioned adapter. The cabin must contain these specifications, closed and reinforced, and only accommodate one person, its working mechanism will be to open the slide gate by the ID card system only by client, to ensure that the customer was not robbed or scammed [6]. The figure below shows the suggested cabin.

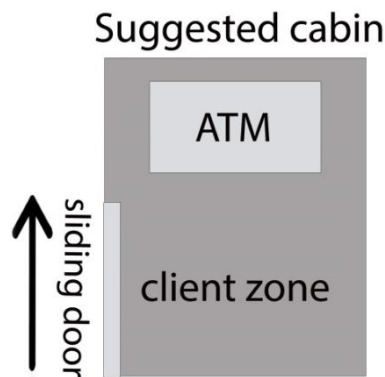


Fig. 2. shows the suggested cabin.

3.2. Software

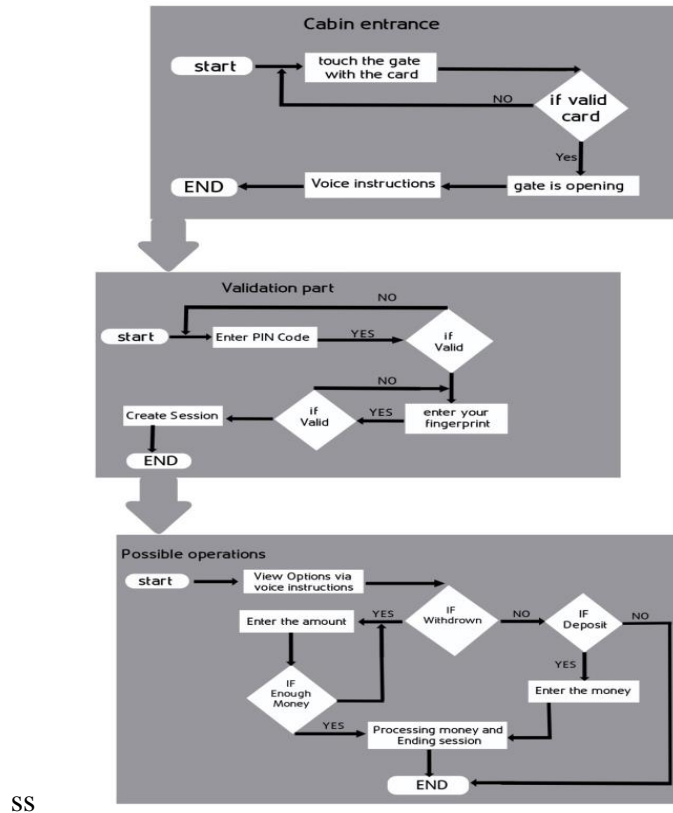
The software includes two main parts to ensure that the work is managed correctly, as well as achieving the required results.

3.2.1. Induction programs (drivers)

Define the system on devices that have been installed to the ATM. The main function of it is Coordinating and ensuring the operation of the cabin equipment in sync with the ATM.

3.2.2. Software to management

Software to manage and determine the progress of operations inside the cabin and give instructions to the client and control the opening and closing of the gate, the creation and end of the session between the client and the ATM while in use. There are three components in the suggested cabin, first one is entrance cabin, second is validation and last one is possible operations, bellow flowchart divided into three sections describes each one of those components. Briefly, the figure below describes the cabin work.



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Fig. 3. shows the suggested cabin’s work.

The easiest, successful and smooth way to describe the mechanism of action of the proposed model is through a scenario divided into three main scenes to describe the possible and expected operations in the ATM cabin from the customer’s entry until his exit from the cabin [10]. First scene: entering the cabin, Scene Two: Verification of Identity, The final scene: possible operations.

3.3. SCENARIO

Scene #1

To enter the cabin, stand in front of the gate and Touch the card to the door and follow the voice instructions [9]:

- The system will open the gate for the client.
- It creates a pre-session as a prelude to call up customer data and create a session between the system and the client.
- Provided voice instructions to the customer and follow-up information of the voice message as follows: Welcome, you in the cabin of the ATM machine, which is designed specifically to meet your needs, please follow the instructions to ensure the success of the operation.

Firstly, a device has been located in front of you to be confirm your identity and be able to complete the process,

Secondly, the device will prepper to create pre-session, during this time, you will listen some voice instructions.

If you want to deposit money you can have to tap on touchpad, then listen carefully and follow the instructions.

Else case of cancellation of the process you can tap and hold the touchpad for three seconds until listen a beep to release, or as soon as you exit the cabin, the process will be cancelled.

If you want to withdraw and transfer money and this section you have to use the keyboard also if you want to cash withdrawal or the transformation you can double-tap to withdraw money, and follow the instructions.

Else case of cancellation of the process, you may can tap and hold the touchpad for three seconds to cancel the operation).

Now, we are moving to validation section.

Scene #2 Validation

- The validation process will be carried out through the PIN code and fingerprint, please, firstly, enter your PIN code by using Braille alphabet or normal numbers on the keyboard, then put your left thumb print in the specific place of the device after it was his guide through voice instructions, after checking the match the fingerprint, you will hear the voice message tell you the result.

- If the result is positive there will be a message as follows (Identity verified successfully and validity of the information, you can send banking transactions, and please follow the instructions that will be mentioned).

- Else a negative result will be a message as follows (does not match. Please try again, you have three attempts will be then suspended the card temporary and will send you a message on your mobile, you can go to one of our bank branches to troubleshoot and re-active your card).

Scene #3 Operations

A. Deposit: when you touch the touchpad of the filing process will hear the next voice message (you decide to deposit money at the ATM).

If you want to continue please confirm the operation by one-tap again on the touchpad and follow the instructions.

Else-if you want to cancel the process, you can tap and hold for three second the board until listen a beep to release).

If you decide to continue one-tap to touchpad, you will be informed of the necessary instructions by voice message as follows (please deposit your money in the deposit slot correctly) the money will be deposited and the client report it via voice message (deposited quantity - the quantity - successfully).

The session ends the client will hear the voice message (the operation is complete, session is closed, for further operations, please put your left thumb on the fingerprint device to start a new session).

B. Withdrawn and transfer: double-tap, to Withdraw and transfer money, the client will hear a voice message of the following

Case of:

1-If you want to choose to withdraw and transfer money, to withdraw money from the ATM, please one-tap on touchpad and listen voice instructions (go to 3).

Else continue listen the next instructions.

2-If you want to transfer money please, two-tap on touchpad and listen voice instructions (go to 4).

Else, to cancel the operation, tap and hold three seconds until listen beep to release.

3-In the case of the first option, The ATM will ask for the amount to be withdrawn by voice message (please enter the amount by using keyboard and press enter to be withdrawn and tap on touchpad to confirm the operation)

The process is done.

The ATM will tell client that his money are came through the voice message (The amount withdrawn have been done. Please make sure to take over the entire amount of your withdrawal money).

3.1. If the client forgot his money there will be an ATM notification to the client via message (you forgot your money take it please before you exit).

3.2. If the client did not respond and take his money the operation will abort and payback the money to his account.

3.3. Go to 5.

4-The second option (money transfer), the ATM will request confirmation process of the client by this message, (please one-tap on the touchpad to confirm the transfer of selected amount of money by using keyboard and press enter)

The confirmation process is completed; the ATM will make the voice instructions

4.1. Transfer money to a specific account, press 0 for another account, Press 1, for Internet services -press 2 for telephone services, press number 3 ... etc.

The customer selects one of the numbers will ATM ask him to confirm the transaction, and then ask him to enter the account number, contract or by phone and after confirming by tapping on the touchpad.

The process is completed.

5. End of session.

4 Conclusion

The one above is the first model, to the idea of building a plug-in adapter for ATM for the blind, to make the latter more interactive than traditional machines and even customized for the blind and is used in some banks. Design as the default setting for the blind customer guides him and tell him to complete the process steps were adopting the principle of tap on touchpad to select any choice and follow voice instructions to achieve the desired purpose, all operations, it has been adjusted to withdraw details and deposit much easier, as well as checking on the client cannot be held liable for fraud or theft, by creating a cabin and checking it through the trace is not only a four-digit code (****) who could know with the blind or friends, besides, as you know, not all blind people have learned to read braille and it must be someone else helping them, so this has been compensated for by the fingerprint and as we have said that the existence of programs to perform these operations, which would mean for the fingerprint a secret code. Therefore, many blind people will be able to work on this type of ATM.

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