Sub-Sahara African Academic Research Publications
March, 2021 Editions

JHSS
Journal of Humanities and Social Science.
Vol.19, No.6, ISSN:2316-7989

A SYSTEM PROTOTYPE FOR AN ENHANCED YORÙBÁ LANGUAGE MENU OPTION OF THE AUTOMATED TELLER MACHINE (ATM)

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Abstract

The research work is focused at developing an enhanced version of the Yorùbá language menu option of the ATM built on an enhanced translation equivalence model and introduction of Yorùbá tone mark in order to assist users who are monolingual only in Yorùbá language to effectively interact with the system. To achieve the objective of the work, the researcher employed the equivalence translation model designed for the work and adopted traditional structured systems analysis and design methodology (SSADM) to build the system prototype. Java packages such as Java Swing, Classes and Java AWTwas incorporated in the system development. Netbean IDE was used in designing the simulation software due to its effectiveness in designing state-of-the-art GUI. The software testing and investigation was conducted engaging specialists to provide stakeholders with information about the quality and function of the system model. The performance of the system prototype showed that the new translation model is not only an improvement over the existing paradigm, but

also will vastly stimulate user's response and expansion of the ATM usage in the interior parts of the country.

Keywords: *Translation Model, SSADM, Java Packages, ATM Network, Host Processor*

Introduction

According to [1], the ATM is described as a computing machine that is connected on a twenty-four-hour real-time system (RTC) to let end users perform banking transactions, make inquiries concerning the status of their accounts, pay bills and obtain other banking services in a public place at any time and without the need for direct interaction with bank staff. The technology allows consumers to perform online transactions and quick self-services anywhere and anytime [2]. Today, ATMs are no more only located in the Bank premises, but also in high traffic areas such as shopping centers, grocery stores, convenience stores, airports, bus and railway stations, gas stations, casinos, restaurants, and other locations [3]. Most ATMs found in banks are multi-functional, while others that are offsite tend to be principally designed for cash withdrawals. Anyone with a credit card or debit card can easily access cash at most ATMs.

The technology in no small measure has tremendously stimulated expansion of the banking networks and offered range of services in recent years. Notably, all banking services, such as electronic payments, loans, deposits and mobile transactions have become heavily dependent on the technology since its introduction as an instrument to aid banking operations. However, as its introduction has changed the face of banking in Nigeria, it also leaves behind some inherent challenges as many bank customers who are not proficient in the English language find it difficult to interact with the machine [4]. In an attempt to provide solution to these challenges, some financial institutions in Nigeria developed and introduced the indigenous language version of the Automated Teller Machine options. However, user's response did not reflect the anticipated level of enthusiasm as a result of operational convolutions and translation equivalence challenges especially for the Yoruba menu option. In view of this, the present work designed a system prototype of an enhanced translation model of the Yorùbá language menu option of the Automated Teller Machine (ATM). Additionally, Yorùbá tone mark was introduced to enhance the model in order to assist those who are only monolingual in Yorùbá language to effectively interact with the system. This is believed, will be an improvement over the present design and consequently widen the scope of ATM usage in the interior parts of the country.

Literature Review

Overview of ATM and its System Operation

The advent of ATMs has revolutionized the field of banking and changed the way banks interact with their customers [5]. It has amplified the ubiquitous nature of banking and could be accessed using Personal Identification Number (PIN) either with ATM card without card. The idea of a PIN stored on the card was developed by a group of engineers working at Smiths Group on the Chubb MD2 in 1965 and which has been credited to James Goodfellow with patent No GB1197183 filed on 2 May 1966, [6].

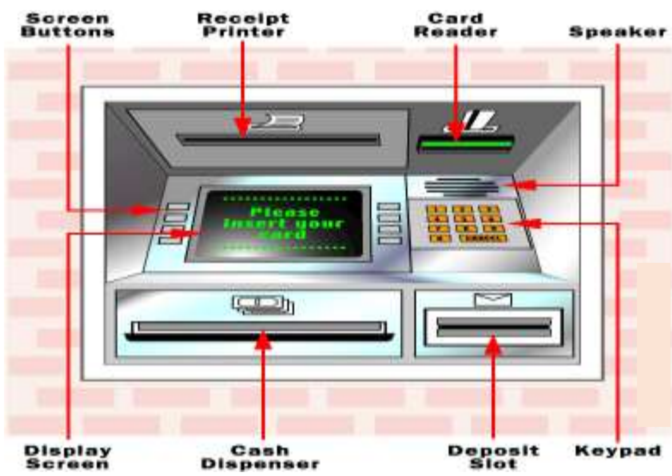
According to [7], the automated teller machine was invented by john Shepherd-Barron in the year of 1960 and was inaugurated at the Enfield branch of Barclays Bank in London on 27th June, 1967. Today, there are over 3.5 million ATMs worldwide as well as more than 200 different kinds of transaction possible on these highly interconnected terminals [8]. The first Automated Teller Machine in Nigeria was installed by National Cash Register (NCR) for the defunct Societe Generale Bank in 1987 and was officially introduced into the Nigerian market in 1989 [4]. The First Bank Plc came on stream with their own ATM in December 1991 [9;10].

According to [11], using an ATM card, customers can make a variety of financial transactions within and outside a nation, most notably transferring of credit to and from mobile phones and on point of sale (POS) device. Even though, the currency being withdrawn or transferred is different from that in which the bank account is denominated, the money can be converted at the financial institution's exchange rate.

Figure 1 depicts the diagram of an ATM system. By design ATMs are different, but they all contain the same basic components [3]. The operation of the automated teller machine consists of mainly two input devices and four output devices; namely:

(i). The Input Devices: (Card reader and Keypad)

(ii). The Output Devices: (Cash Depositor, Receipt Printer, Display Screen and Speaker)



: chip on the front of the card or the magnetic strip on the back of the card when inserted into the machine. The card is swiped or pressed on the card reader which captures user's details and accounts information. The data from the card is passed on the host processor (server), and the host processor thus uses this data to get the information from the cardholders.

The **keypad** is used by the customer to input their transaction information, including personal identification number (PIN) and the type of transaction required. The keyboard contains 48 keys that interface with the processor.

The **cash dispenser** is the heart of the ATM. This is a central system of the ATM from where the required money is obtained. From this portion, the user can deposit and collect their dispensed cash. The cash dispenser counts each bill and given the required amount to the user. Meanwhile, in some cases, where we have folded cash that cannot be dispensed, the machine automatically rejects the bit as a result of the high precision of the machine. All these actions are carried out by high precision sensors. A complete record of each transaction is kept by the ATM with the help of a real time clock (RTC) device.

The **receipt printer** prints on request, all the details of withdrawal/deposits, date and time of user's transaction.

The **display screen** displays each step of transactions and information. A CRT screen or LCD screen is used by most of the ATMs.

The **speaker** provides audio feedback when a particular key is pressed.

Figure 2 and Figure 3 depict the ATM System Context and block diagram respectively.

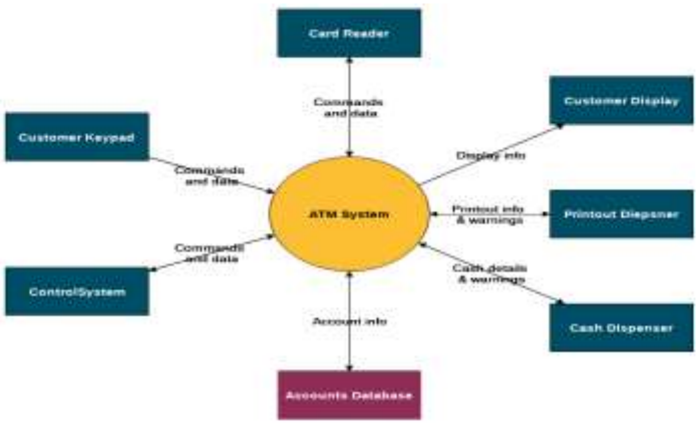


Figure 2: ATM System Context Diagram

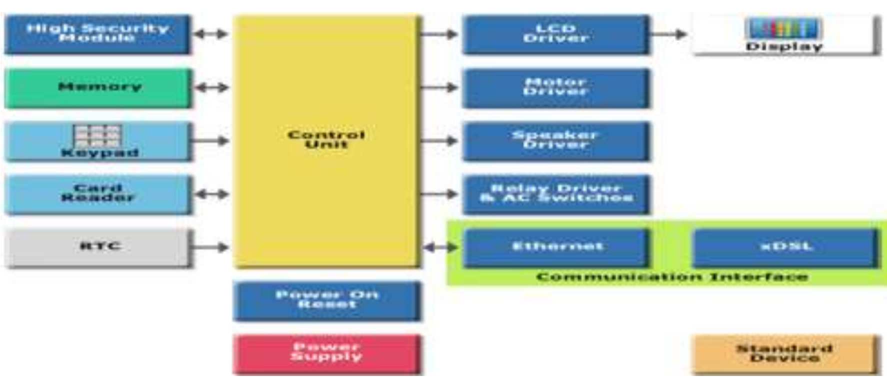


Figure 3: Block Diagram of ATM

Source: Elprocus (2020)

2.2 Major Types of Automated Teller Machines

According to [3], there are two major type of Automated Teller Machines, namely the leased-line and dial-up machines:

2.2.1 Leased Line ATM

The leased line ATM are the type of ATM connected directly to the host processor through a four-wire point to point dedicated telephone line. They are preferred for a very high-volume location because of their throughput capability. However, the operating cost of the machines is very high.

2.2.2 Dial-Up ATM Machines

The dial-up ATMs is the type that connect the host processor through a normal phone line using a modem and a toll-free number, or through an Internet service provider using a local access number dialed by the modem. These require a normal connection, and their initial installation cost is much less. The operating cost of these machines is low compared to the leased line machines. They are preferred for retail merchant locations where cost is a greater factor than throughput. Figure 4 shows the telephone network communication between the ATM, host computer and bank computer.

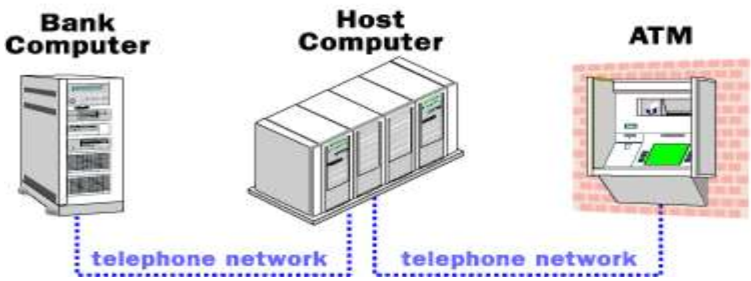


Figure 4: Telephone Network Communication between the ATM, host computer and bank computer.

2.3 ATM Networks and Operating System

The machine, like any other data terminal, has to be connected to and communicate through, a host processor. The host processor is analogous to an Internet Service Provider (ISP) in that, it is the gateway through which all the various ATM networks become available to the cardholder. The ISP plays an important role in the ATMs as it provides communication between the ATM and host processors. When a transaction is made, the details are keyed in by the cardholder, and the information is passed on to the host processor by the ATM. The host processor checks the details with an authorized bank, and if the details are matched, the host processor sends the approval code to the machine so that the cash can be dispensed or transferred. Figure 5 shows a conceptual ATM Network model.

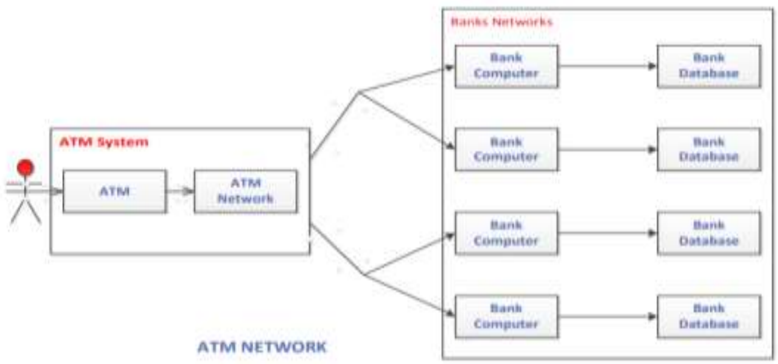


Figure 5: Conceptual ATM Network Model

Most ATMs are connected to interbank networks, enabling people to withdraw and deposit money from machines not belonging to the bank where they have their accounts or in the countries where their accounts are held. Some examples of interbank networks include: NYCE, PULSE, PLUS, Cirrus, AFFN, Interac, Interswitch, STAR, LINK, MegaLink, and BancNet [13].

The ATMs for its operation rely on authorization of a financial transaction by the card issuer or other authorizing institution on a communications network. This is often performed through an ISO 8583 messaging system. ISO 8583 is an international standard for financial transaction card originated interchange messaging. It is the International Organization for Standardization standard for systems that exchange electronic transactions initiated by cardholders using payment cards.

Vast majority of ATMs worldwide use a Microsoft Windows operating system, primarily Windows XP Professional or Windows XP Embedded. In early 2014, 95% of ATMs were running Windows XP [14]. A small number of deployments may still be running older versions of the Windows OS, such as Windows NT, Windows CE, or Windows 2000, even though Microsoft supports only Windows 8 and Windows 10. There is a security view by the computer industry that, general public desktop operating systems(os) have greater risks for cash dispensing machines than other types of operating systems like real-time operating systems (RTOS) [15].

ATM Security

Over the past three decades consumers have primarily depended on and trusted the ATM to conveniently meet their banking needs. However, in recent years there has been a proliferation of ATM frauds across the globe. The growth of ATM and other electronic transactions has resulted in many social engineering challenges. There have been many reports of hacking into the electronic ATM system and this has caused losses of billions of dollars in the global banking industry. Therefore, managing the risk associated with ATM fraud as well as diminishing its impact is very crucial, more importantly as the fraud techniques have become more advanced with increased occurrences [16].

Predominantly, access codes for bank accounts and computer systems depends on personal identification numbers (PIN's) and one-time password (OTP) for identification and security clearances. Hence, popular ATM frauds/attacks are card trapping or skimming, hacking and cracking of PIN codes, identity theft, shoulder surfing to highly advanced techniques involving software tampering and/or hardware modifications to divert, or trap the dispensed currency [17].

Security, as it relates to ATMs, has several dimensions. The primary method used to increase awareness and deter fraud attempts at the ATM, is the installation of Closed Circuit Television Camera(s) (CCTV) mounted in plain view on or near the ATM. Video surveillance used in the branch environment also has proven itself valuable as it continually assists in the deterrence and apprehension of bank robbers. This method has been primarily used to increase awareness and deter fraud attempts at the ATM. The availability of remote video surveillance makes this option even more effective as a monitoring of the ATM and surrounding area can be directed from remote locations at any time.

However, with recent development, experiences show that the conventional method of identification is not all that reliable with the recent fraud cases.

Hence, an embedded biometric authentication scheme for Automated Teller Machine (ATM) as presented by [18] is recommended. This provides a better means to secure our electronic transactions better than conventional methods.

RESEARCH METHODOLOGY

Research Design and Approach

The traditional architecture of the structured systems analysis and design methodology (SSADM) was adopted in the design and development of the new system following the waterfall model. SSADM is a well-defined methodology that is used mostly in the analysis and design stages of system development to provide logical data modeling and a well-defined set of activities and deliverables. The development is intended to improve and modify the existing system design. The new system integrated an enhanced translation equivalence model and introduction of Yorùbá tone mark in the building of the enhanced version of the Yorùbá language menu option of the ATM. Figure 6 and Table 1 showed the equivalence translation model and samples of Yorùbá tone mark version considered in this work respectively.

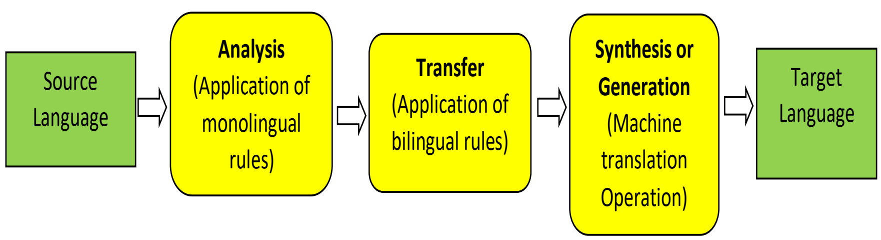


Figure 6 shows the equivalence translation model

Source: [4]

Table 1: Samples of Yorùbá tone mark version

S/N	TRANSLATION ON THE ATM OF THE FINANCIAL INSTITUTION CONSIDERED	PROPOSED EQUIVALENCE	ENGLISH EQUIVALENCE
18	Nibayi	Kọ̀rẹ̀ntì	Current
19	Ifowopamo	Séfísì	Savings

20	Owotowole	Kírẹ́dítì	Credits

System Development and Implementation

Java packages such as Java Swing, Classes and Java AWT were used during the system development. Netbean IDE was used in designing the simulation software due to its effectiveness in designing state-of-the-art GUI. The Netbean IDE was considered due to its flexibility and compatibility with Java programming. According to Date (2003), the IDE makes the creation of the GUI easier and helps in debugging, testing, cleaning and building the application. In the design, different classes were presented to handle the transaction options, and event handlers are assigned to each button to perform a specific function once the button is pressed. Java Database and MYSQL were considered for the storing of users' account, and creation of the account number and PIN were done inside the program and stored in the database. Figure 6 and Figure 7 depict the conceptual flow diagram of the ATM system model.

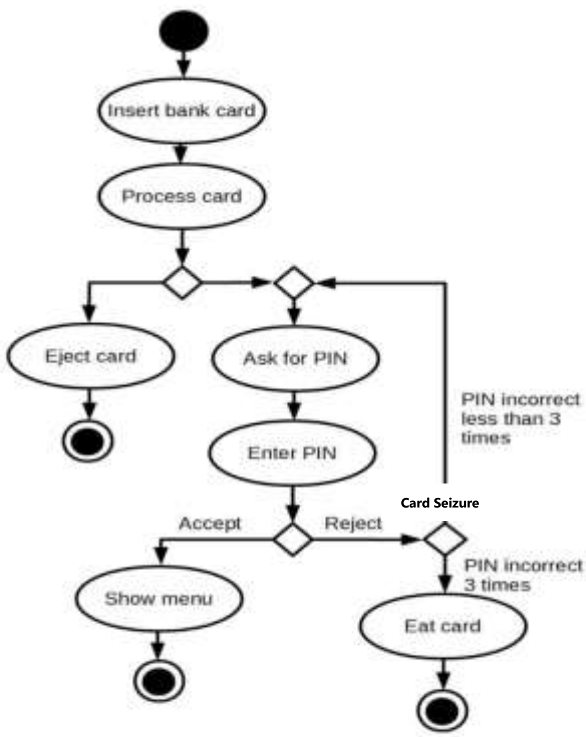


Figure 6: Conceptual Flow diagram of the ATM System

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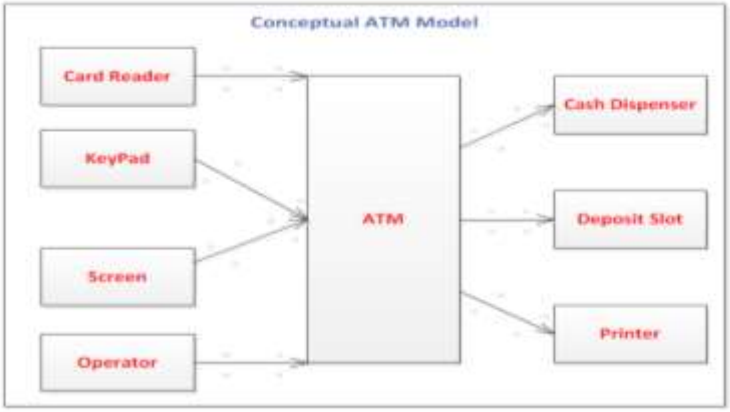

Figure 7: Conceptual ATM Model

Figure 8, 9 and 10 show the snapshots of the interfaces and transaction modules of the ATM system prototype.

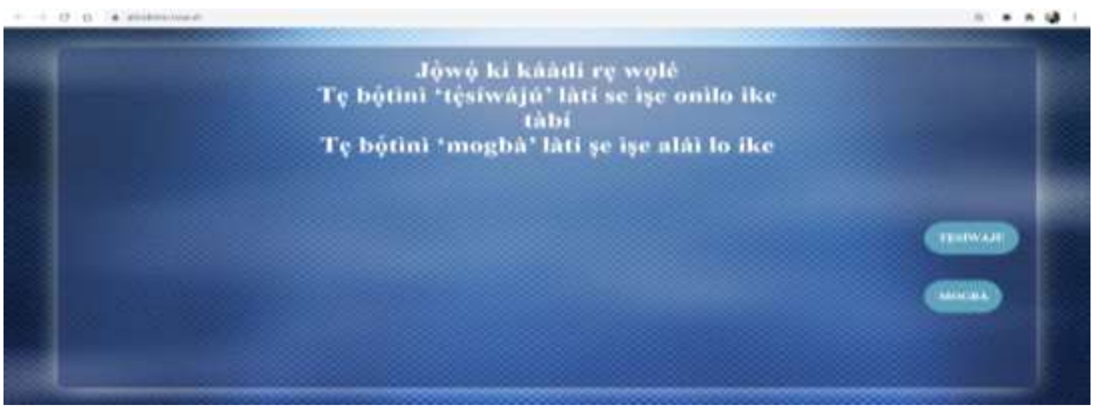

Figure 8: Welcome Interface

Figure 9: Card Insertion Interface

Figure 10: Menu Option Interface

CONCLUSION

The research work presented a system prototype for an improved Yorùbá Language menu option of the ATM as proposed in this work. The work integrated an enhanced equivalence translation model and the Yorùbá Language tone mark in order to assist those who are monolingual only in Yorùbá language for effective interaction with the system. The software testing and investigation was conducted engaging specialists to provide stakeholders with information about the quality of the system service. Specifically, the unit, component and system testing were done to prove the functions of the model system's compliance with its specified requirements. The performance of the system prototype showed that the new translation model is not only an improvement over the existing paradigm, but will also vastly stimulate user's response and expansion of the ATM usage in the interior parts of the country. The system model is recommended to financial institutions for full implementation.

REFERENCES

[1]. Wong, K. M. (2012). A thesis submitted in partial fulfillment of the requirements for the award of degree of Bachelor of Computer Science (Computer System and Networking) Faculty of Computer System & Software Engineering Universiti Malaysia Pahang (UMP).

[2]. Corporate Finance Institute Education Inc. CFI (2020). What is an Automated Teller Machine (ATM). Retrieved on 20/11/2020 Available on: https://corporatefinanceinstitute.com/resources/knowledge/other/automated-teller-machine-atm/

[3]. Kagan, J. (2020). Automated Teller Machine (ATM). Investopedia. Retrieved from https://www.investopedia.com/terms/a/atm.asp# on 15/10/2020.
[4]. Oyebade, F. O., Aranuwa, F.O & Adéjùmọ̀, J. A (2020). Improved Yorùbá Language Option of the Automated Teller Machine using Translation Equivalence Model. International Journal of Linguistics, Literature and Translation (IJLLT). 3(7), 53-61. DOI: 10.32996/ijllt. Available online at: www.ijllt.org.
[5]. Batiz-Lazo, B (2013). "How the ATM Revolutionized the Banking Business". Bloomberg. Archived from the original on 9 February 2014.
[6] James, G (2018) Automated Teller Machine Series 2, Pioneers - BBC Radio 4 Extra". *BBC*. Retrieved 29 March 2018.
[7] Lee, M. (2016). Automated Teller Machine. ATMIA Fact Sheet. https://www.atmia.com
[8]. ATMIA (2015). Automated Teller Machine. ATM Industry Association (ATMIA), ATMIA 50th Anniversary Factsheet" (PDF). www.atmia.com. ATM Industry Association. October 2015. Archived (PDF) from the original on 18 August 2016. Retrieved 29 June 2016.
[9]. Adeoti, J.A (2011). Automated Teller Machine (ATM) Frauds in Nigeria: The Way Out. *Journal of Social Sciences*, 27(1): 53-58.
[10]. Jegede, C. A (2014). Effects of Automated Teller Machine on the performance of Nigerian Banks. American Journal of applied mathematics and statistics 2(1) 40-46.
[11] Schlichter, S (2007). "Using ATM's abroad - Travel - Travel Tips - NBC News". NBC News. Retrieved 11 February 2011.
[12]. Sulfworks (2001). ATM System
[13]. Interac (2018). Interac Cash web page. Interac Association. Retrieved 2 July 2018.
[14]. Verge (2018). "The death of Windows XP will impact 95 percent of the world's ATMs". *The Verge*. Archived *from the original on 4 December 2017*. Retrieved 23 January 2018 [13]. Elprocus.com (2020). Automatic teller machine Advantages. https://www.elprocus.com/automatic-teller-machine-types-working-advantages/. Retrieved on 15/10/2020.
[15] Risk Digest (2018). "Risks search results for "cash machine"". *Archived from* the original *on 27 July 2018*. Retrieved 2 November 2010.
[16]. Diebold (2002). ATM Fraud Security White Paper. Diebold, Incorporated [20]. Date, C. J (2003). An Introduction to Database Systems. United Kingdom: Addison-Wesley Longman
[17]. Nana K. G, Mustapha, A. M, Kwaku, N, Ferdinand, K & Jamal-Deen, A (2016). Enhancing the Security Features of Automated Teller Machines (ATMs): A Ghanaian Perspective. International Journal of Applied Science and Technology 6(1), 102-111.
[18]. Aranuwa, F. O & Ogunniye G B (2012): "Enhanced Biometric Authentication System for Efficient and Reliable e-Payment System in Nigeria". International Journal of Applied Information Systems (IJAIS), New York, USA 4(1), 56-61.

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