ATM System based on Fingerprint Recognition

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Abstract

The traditional approaches, such as ID card verification or signature, do not offer accuracy and dependability. The systems used at these locations must be both quick and reliable. The use of the ATM (Automatic Teller Machine), which offers users convenient banknote trading, is up against a new challenge: maintaining the customer's legitimate identity. Since using an ATM for conventional identification has become more common, customers are suffering financial losses as a result. The R307 fingerprint scanner is used by the system to take fingerprints. Due to fingerprints' individuality, this technology can be used in any application while providing increased security. It is practical because it requires little power and is portable.

Keywords*: ATM, R307 fingerprint scanner, USB to TTL Module.*

INTRODUCTION

People have been using financial services like banking on a global scale for decades. We can transact without worrying about the hours of operation because of services like internet banking and Automated Teller Machines (ATMs). The most widely used mechanism for cash transactions is the ATM. We can easily withdraw cash from any location using a designated ATM card. But using these services could pose a threat to our security due to the chances of banking fraud and malpractice by hacking passwords, pins, etc. More Smart and secure transaction systems must be developed to prevent incidents of this sort. Anyone who has access to the ATM card pin can withdraw money from your account under the current functioning of the ATM system. Tangible keys like smart cards and magnetic stripe cards can get lost, copied, stolen, or left behind. Passwords can also be shared, forgotten, hacked, or accidentally read by a third party. There must be a more authentic and complicated verification mechanism introduced to secure ATM-based transaction systems to prevent unwanted losses.

LITERATURE REVIEW

There are two promising image-based biometrics, faces, and fingerprints. For each image-based biometric the authors have dealt with, a critical assessment of the state-of-the-art technology related to that specific type of recognition, suggesting future research directions for further development, and identifying technological challenges while doing so[1]. The entire process is highlighted step by step. Capturing the data, storing it in the database, and matching the fingerprints. We get to learn about the process and implement it in making our project[2]. The proposed fingerprint system is a new mechanism for increased safety and protection. The only way to validate a unique mark is to use a person's finger impression. By coordinating the client's data, such as pin code and unique mark coordination, fingerprint and PIN code distinguishing proof can be obtained. Then, in two stages, describe the whole Fingerprint-based ATM framework: the phases of enrolment and authentication[3].The user must first register with the system by providing the necessary basic and personal information. In addition, the user must provide the thumb impression to the hardware interface, which stores the fingerprint image along with the other user data in the database.[4].

METHODOLOGY OF THE SYSTEM

This project offers a straightforward method for using biometric identification to increase the security of ATM transactions. We used the Software Development Life Cycle (SDLC) process to create the application. Analyzed the features we need to include in our application first. The procedures taken to develop the application utilizing the SDLC are shown in Figure 3.1. Starting with the home page, different windows, etc., we planned the appropriate application structure.For the basic interface of the banking system, we have used the Tkinter library in Python to create Login, Register, Account Action, etc. pages that allow the user to interact with our system.In essence, we have created a GUI program with numerous windows, including those for logging in, registering, viewing user information after logging in, etc

To connect the fingerprint sensor to the application, we have used the Adafruit library in Python itself. This library allows us to do various functions such as fingerprint recognition, create model, store model, etc. We currently use File Handling to store user information, but in the future, we plan to expand it by linking to a MySQL database.

The process of our project's whole procedure is displayed in Figure 3.2. Fingerprint Sensor and USB to TTL Adapter Module Connection: The Fingerprint Sensor has 6 terminals and the USB to TTL Module also has 6 terminals. They are connected to each other as follows:

Fingerprint Sensor	**USB to TTL Module**
5V - Input for Power supply	5V - Output Power Supply
GND - Ground terminal	GND - Ground Terminal
TX - Data Output	RX - Data Input
RX - Data Input	TX - Data Output

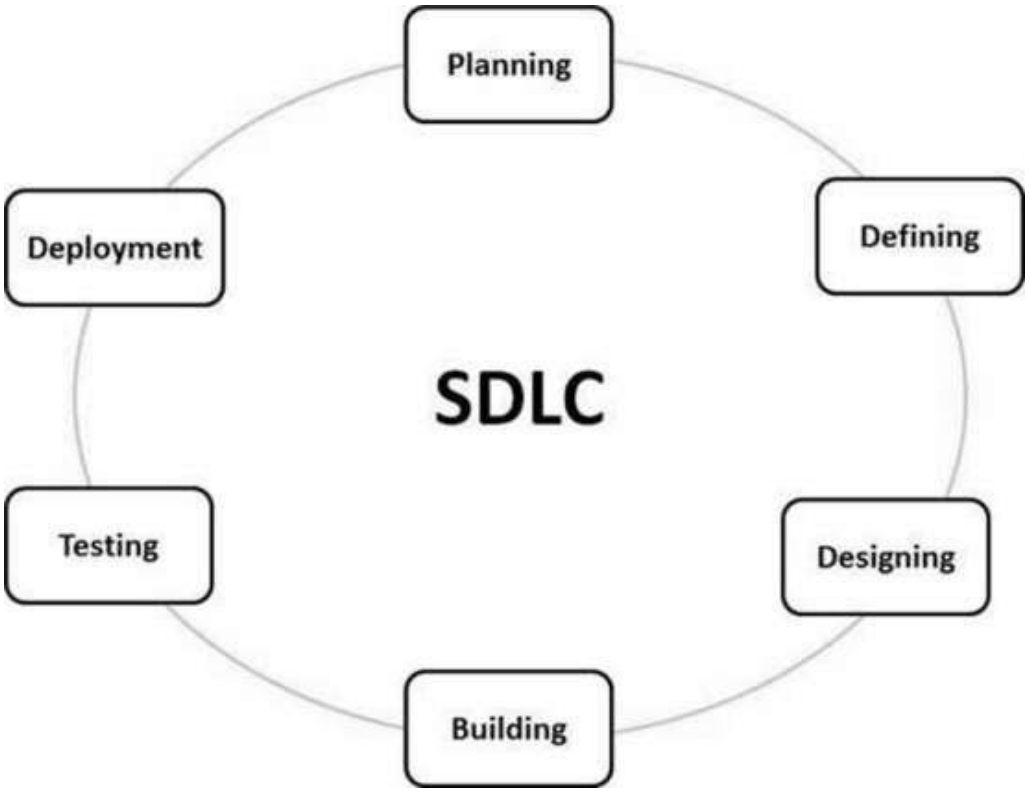

Fig. 3.1 SDLC Process

Flowchart :

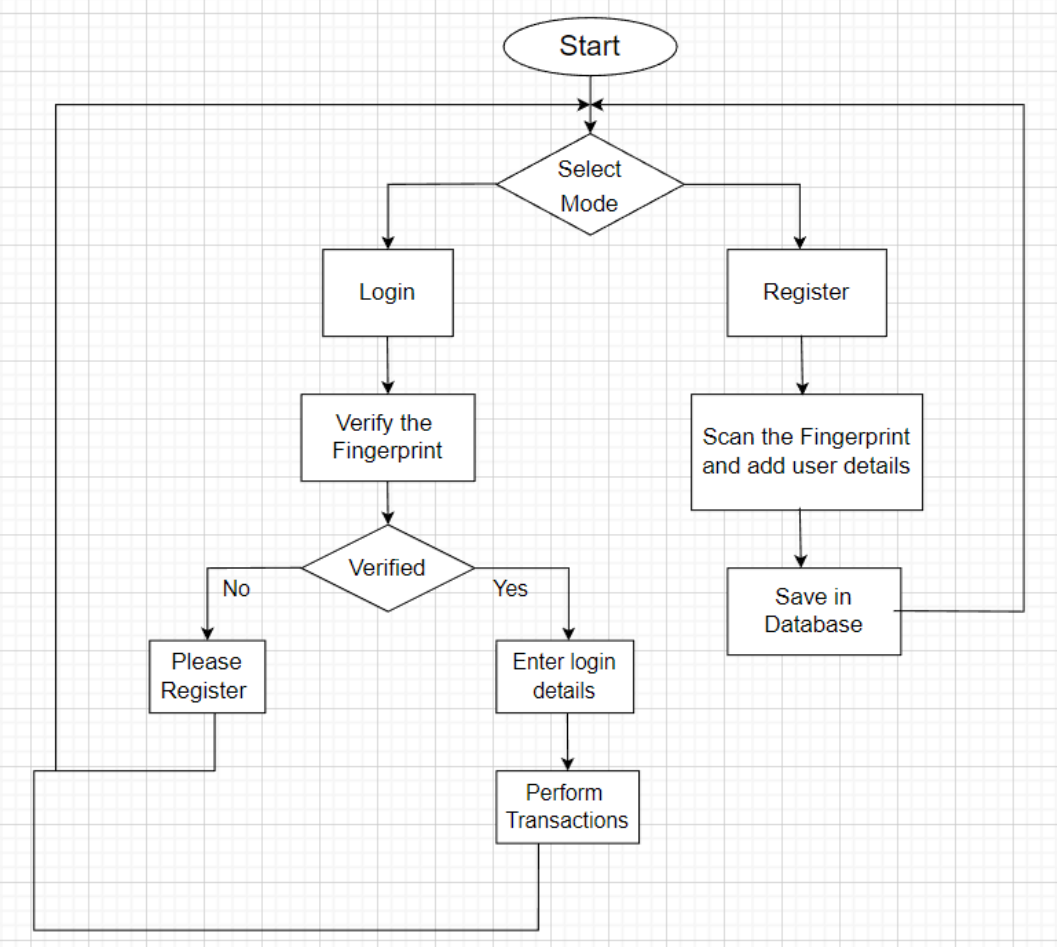

Fig. 3.2

RESULTS AND DISCUSSION

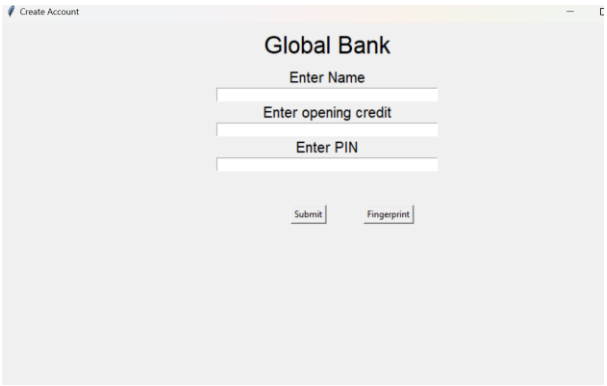

Fig. 3.3

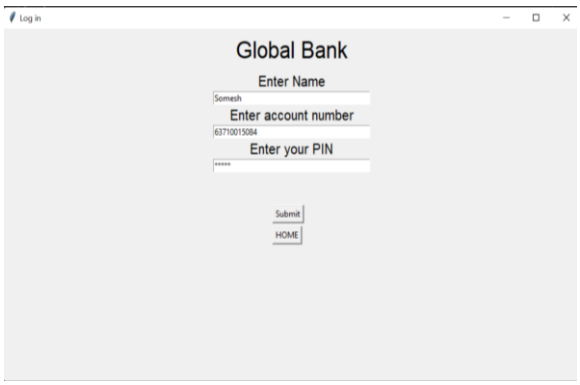

Fig. 3.4

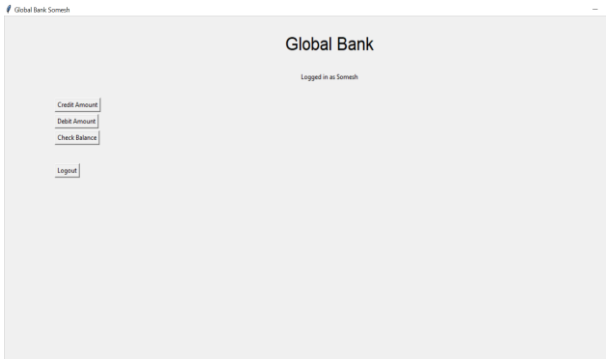

Fig. 3.5

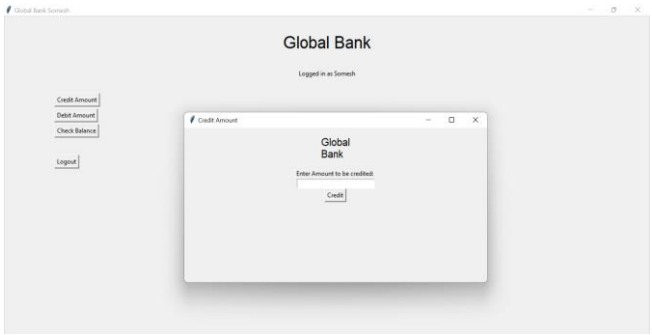

Fig. 3.6

CONCLUSION

ATMs increase the credibility of banking organizations by providing easy access to cash transactions. Withdraw cash anytime, anywhere without waiting in line. Therefore, ATM cards are used wildly, but you have to face fraud related to ATM transactions. To make ATM transactions more secure, biometric scanning devices are used to identify account holders.

In this project, our main concentration is on the end-user and people with poor literacy. The traditional means of confirming that the client's fingerprints were entered correctly were sent by the administrator and included in the execution of ATM protection by fingerprint availability. For the safety and reliability of the client's identification, the protection function was greatly enhanced. The entire system was built using a fingerprint method, which makes the mechanism secure, reliable, and simple to use. Due to the simplicity of the technique, this technology will be the most advantageous in electronic or digital money transactions.

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REFERENCES

[1]P. Jonathon Phillips, R. Michael McCabe, Rama Chellappa "BIOMETRIC IMAGE RECOGNITION", IEEE Xplore, EUSIPCO, 1998.

[2] Mouad M.H. Ali, Vivek Hilal Mahale, Pravin Yannawar, Ashok Gaikwad "Overview of Fingerprint Recognition System", International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), 2016.

[3] T Sangeetha, M Kumaraguru, S Akshay and M Kanishka, " Biometric based Fingerprint Verification System for ATM machines", Journal of Physics Conference Series 1916(1):012033, 2021

[4] Soukhya S M, Sonu G, L Karthik Narayan, Dr.Manju VC, "Fingerprint Recognition and its Advanced Features", IJERT Volume 09, Issue 04, 2020