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# A Review paper on The Fingerprint Based Locker System

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**Abstract -** A contemporary and safe method of accessing bank lockers is through a fingerprint-based system. Before giving access to the locker, it verifies the user's identity using biometric authentication technology. The hardware and the software are the two primary parts of the system. The control panel, locker, and fingerprint scanner are all parts of the hardware. The control panel is in charge of overseeing the authentication procedure and regulating locker access. The database that houses user data, including fingerprints, locker numbers, and access records, is a part of the software. The system also features an administrator interface for managing user accounts, adding or removing users, and monitoring access logs. A user must use the fingerprint scanner to scan their fingerprint to access their locker. The hardware and the software are the two primary parts of the system. The control panel, locker, and fingerprint scanner are all parts of the hardware. The control panel is in charge of overseeing the authentication procedure and regulating locker access. The database that houses user data, including fingerprints, locker numbers, and access records, is a part of the software. The system also features an administrator interface for managing user accounts, adding or removing users, and monitoring access logs.

***Key Words*:** Control panel, locker, fingerprint scanner, RFID, Microcontroller, GSM technology.

## 1. INTRODUCTION

A highly sophisticated and secure solution that lets consumers access their bank lockers using their biometric information is the fingerprint-based bank locker system. Before giving access to the locker, this system uses cutting-edge biometric authentication technology to confirm the user's identity. Although it has been frequently used to secure bank lockers, the conventional lock and key system have several shortcomings. The keys could be misplaced, taken, or copied, allowing someone else to enter the locker without authorization. Banks have begun implementing fingerprint-based bank locker systems to address these issues. Physical keys are not required with the automated fingerprint-based bank locker system. For user identification and identity verification, the system employs a fingerprint scanner. This technique offers a high level of protection to the users because it is highly secure and impossible to copy. In summary, the fingerprint-based bank locker system is an extremely sophisticated and safe technology that gives consumers a quick and easy way to access their lockers. Customers benefit from having peace of mind while valuable items are kept safe and secure in bank lockers.

## 2. LITERATURE SURVEY

Subhash et al[1] This study focused on developing and implementing a highly reliable and secure bank locker protection system based on RFID, biometric fingerprint, password, and GSM technology. This has a removable battery banking institution, location of employment, school, and residence. A legitimate person can pick the lock in this technique and retrieve important documents, jewels, or money from the lockers. RFID, biometric fingerprint, password, and GSM technical programmes are all utilized in this security procedure. In our suggested system, a user must first register their username, password, and mobile number. After that, they must place their finger on the fingerprint module so that their fingerprint may be read and stored with their finger id. The user enrolment process could be finished in this way. The individual will take part in the login process. While logging in, a person must first check their RFID tag on the RFID reader to see if it

is sufficient before using their fingerprint. Any decent person can be scanned.

Atar Nasrin et al[2]This study is based on the creation and implementation of a highsecurity locker system based on GSM, fingerprint, and password technology that can be arranged into houses, covered workplaces, and banks. By using this strategy, a financial institution will compile biometric information on each person to assign lockers and ensure that only respectable men and women can retrieve cash and documents from the locker. We have now implemented a locker security method based on fingerprint, secret word, and GSM technology with a door-locking method that can prompt, approve and validate the person while simultaneously unlocking the door for a locker at ease entry. One of the various types of biometrics used to recognise people and verify their identities is fingerprinting. The technology can be used to identify, track, categorize, or become aware of a variety of items. For many simplest approved humans to unlock the different financial institution locker with GSM science, they simply need to scan one Fingerprint module. The RAM of the ARDUINO UNO held more data the more people used it. An ARDUINO UNO ARM microcontroller is connected to the scanner; it will be in charge of managing the scanning process. A person uses a keypad to enter the secret code after the scanning is finished in to open his locker. The locker will likely be opened immediately. If the secret uses a keypad to push again after the work is finished, the locker door will close once more. An indicator will be supplied by a buzzer connected to the controller if an unauthorized person attempts to scan their fingerprint image. If the user enters an erroneous code phrase, another signal will also be given via the buzzer. By using a new registration technique and deleting the previous person's fingerprint image, the current user can instead create a new user for a similar locker. The ability to change the key code is also an option.

JordiSapes et al[3] This work entails the development of a low-cost, competitive fingerprint security environment that is embedded within a Raspberry Pi B+ (hence referred to as Raspberry) running Raspbian Linux on a GT (511C1R) device. This work provides an initial understanding of the practicality of merging a fingerprint sensor and a Raspberry Pi running Linux into the same framework and providing a personal user experience using a web server. This initial prototype, known as Finger Scanner, is a security strategy that offers consumers a way to be verified by making use of a fingerprint scanner. Then, on top of it, many more intricate approaches can be built using the Finger Scanner. But, we are curious about concentrating our attention on creating an efficient prototype with an aggressive design. This document can serve as the foundation for numerous doable projects that inspire developers of Raspberry and related boards to produce exciting initiatives including accessibility and security combined with affordable fingerprint scanners. A nontoxic safe deposit box with a finger scanner might be an example mission. Today, several businesses in the money-handling industry that employs fingerprint sensors worry about the costs of the sensors and the fingerprint tools (used to advance an application). So, our project could become the cornerstone of affordable programmes based on fingerprint sensors.

Omidiora et al[4]This study Rejected conventional bike locking methods, they developed fingerprint-based lockers as a strong security measure in some restricted places. They provide hardware for the interface and use their prototype application module to store valid clients' data in a database. Visible Basics, Visual C, and Visible C++ were used for programming. This prototype's programming was carried out using the manufacturer's adaption of Visual Basic 6.0. Twenty scan images that were kept in the database were utilized to validate the prototype. The implementation was once successful, and there was a clear distinction between allowed and unauthorized users on the microcontroller

. CrystalynneD.C et al[5]This study took into account the creation of a biometric locker method with a brief message carrier that is microcontroller-centered. Before, a 9-12Vdc was used to power the system. The enter and output hardware devices were interfaced using the microcontroller ATMEGA 644 contained in an Arduino board. The fingerprint sensor for biometric identification, the keypad for encoding motion codes in the past, and a real-time clock for showing the current date and time are examples of input devices. The microcontroller is programmed with the aid of an environment for development that is integrated with Arduino. The system's microcontroller was an ATmega644 mounted on an Arduino board. It oversaw

the biometric locker method's features. The ATmega644 is an eight-bit, forty-pin, low-power CMOS microcontroller built on the AVR-enhanced reduced instruction set computer (RISC) architecture.

Sagar et al[6]This study put up a plan for a biometric and GSM-based financial institution locker security strategy. The user will enrol his user identification password and cell number initially in our suggested approach. Upon the person placing a finger on the fingerprint module, the computer's digital camera will automatically turn on and capture the user's face for use in face identification. After that, the user's finger will be scanned for use in finger identification. A customer enrollment process could be accomplished in this way. The user face of the man or woman will be made aware throughout the login operation and the fingerprint can be scanned. The individual will participate in the login procedure. The mobile phone number of the individual who entered will be displayed on the liquid crystal display for the duration of enrollment if the ID becomes invalid. The character's mobile phone will get the code via GSM. And then someone will enter the code using the keypad; if the code matches, either the light will blink or the lockers will open. Moreover, message submissions will be displayed on liquid crystal displays. We are using the R305 fingerprint module in our challenge. This module records the individual's finer details as their fingerprint identity. It is worth less than 0.001%. And the FRR value is 0.1%. This sensor effectively captures photos with a resolution of 500 dpi and has good photo processing capabilities. A small LQFP64 box houses the 16/32-bit ARM7TDMI S microcontroller known as ARM. It contains 32 kB to 512 kB of on-chip flash memory and static RAM that ranges from eight kB to forty kB. It offers low energy, tiny measurement, and great performance. It connects to the computer's UART0 interface using a serial connection and has two UART pins, UART0 AND UART1.

Arvasu Chikara et al[7] a smart locker has been created for the banking industry, it is detailed. The key characteristic of this work is that it records the time, date, and quantity of access blockers used in the bank by a user. Your image and fingerprint will be compared to information already saved in the database by the smart lock programme. The microcontroller (Arduino) will send a signal to the lock, and it will open after verifying the user's legitimacy. When the number of permitted access turns grows for a certain period, it also sends a notification.

Sujata Pandey et al [8] The multilayer security system described in this paper can be used to stop thefts in houses, bank lockers, and other locations. The combination of three security measures, which are based on the sequential use of (I) RFID, (II) passwords, and (III) biometrics, provides multilayer security. A microcontroller is used to control all three components. The multistage security of the proposed system makes it more dependable and effective, and the combination of all three levels may prevent a breach.

Raj Gusain et al [9]To secure expensive possessions, the goal of this article is to design a bank locker security system that makes use of Facial Recognition, Iris Scanner, and Palm Vein Technology (PVR). A facial recognition system uses MATLAB software to recognise and authenticate the image of the authorized user. The camera captures photographs of a person entering an open area, and the programme then compares those images to a database of authorized individuals. The Iris Recognition system makes use of the human body's kind features. For biometric authentication, this technology is used in ATMs, immigration and border control, public safety, hospitality, and tourism, among other places. This research provides methods for enhancing the palm vein detection system's capabilities by modifying the vascular pattern thinning algorithm. The Palm Vein Recognition (PVR) technology recognises a person's palm vein pattern and compares it to information kept in a database for authentication. This method is regarded as the most secure and effective method for security needs because it is very dependable, accurate, and secure.

R. Ramani (2012) et al[10].In this study, a bank locker security system based on RFID and GSM technology was described. This system can be set up in banks, secure offices, and houses. Only a genuine person can retrieve the money from the bank locker under this approach. A door-locking system based on RFID and GSM technology has been installed as part of our bank locker security system. This system can activate, authenticate, and validate the user while simultaneously unlocking the door for bank locker security access. GSM and passive RFID are more secure than other systems, which is their key advantage. This system is made up of a microcontroller,

RFID reader, GSM modem, keyboard, and LCD. In this system, the RFID reader reads the identification number from the passive tag and sends it to the microcontroller. If the identification number is valid, the microcontroller then sends an SMS request to the authenticated person's mobile number, asking for the original password to open the bank locker. This system is more secure than other systems because two passwords are needed for verification. If these two passwords match, the locker will be opened; if not, it will remain closed. Also, this system generates a record that includes each user's check-in and check-out times as well as some basic information about them.

Raghu Ram.Gangi et al[11]proposed hybrid biometric fingerprint verification of an ATM (Automatic Teller Machine) security solution. The availability, dependability, and high accuracy of the fingerprint feature led to its selection. To safeguard the ATM, it is simple to install a biometric system based on fingerprints. When a customer places their fingerprint on the fingerprint reader when they use the ATM to withdraw cash, the system wants to take their fingerprints. It accurately determines if a fingerprint is authentic or not using biometrics to verify and identify it. We can attempt to safeguard it and manage the ATM crime circle in this way.

Sanal Malhotra et al [12] An RFID and GSM-based banking locker security system with odour detection, security questions, and use in individually secured locations has been presented. The only person who can use his locker is the original account holder. This system is more secure than any other system since it makes use of odour identification, the security question method, RFID technology, and GSM technology. Because four steps are needed for verification, the system is more secure. The locker's RFID tag is verified using RFID technology after which a valid person must respond to a security question using a software technique and it must match the security question that was initially stored (during account opening). Then, using GSM technology, the valid person must enter a password on both the locker's keypad and his mobile device, and both passwords must match to open the locker's door. Finally, odour identification will be used to confirm the identity of the valid person.

Hiloni S. Detroja et al[13] A high-security locker system based on RFID, fingerprint, password, and GSM technologies has been presented. It can be set up in a bank, secure offices, and houses. Only a genuine person can retrieve the money from the locker under this system. One type of biometric used to identify people and confirm their identification is the fingerprint. RFID uses radio frequency transmission to identify a person or an item. RFID stands for radio frequency identification, and the technology can be used to track, detect, and electronically exchange data about a wide range of objects.

Amit Saxena et al [14] The locks that are typically used on bikes don't offer bike owners enough security. Conventional locks found on bicycles are widely known. They are easy prey for robbers and can be shattered by them. More security options are therefore required for motorcycles, which are special and require alternatives to conventional key locks. Systems that utilize biometric data can be a reliable and useful security measure. Fingerprint identification is a crucial and highly trustworthy human identifying technique. Every person has a unique fingerprint, thus it can be utilized in a variety of security measures. The paper that is related to this work includes a comprehensive comparison. The earlier research on this topic is presented in this paper. Comparatively, some additional techniques for enhancing security have been demonstrated. The security of motorcycles can be improved by the addition of various locks and alarm systems that can notify the owner of the bike when it is in danger.

Prajwal et al[15] advocated the requirement that a bank client waits for authorized bank staff before using a master key to open the customer's bank locker. We have suggested a locker system, based on RFID and password technologies, to address this problem. To protect valuables, this method is also used in offices, Smart Cash Boxes, and home safes. When a client approaches the locker room, an IR sensor activates, requiring the customer to present their access card. If the customer does not do so within 60 seconds, a buzzer activates, allowing only those who have been authenticated to enter the locker room. The customer is once more prompted to present the access card for their specific locker once they are inside the changing area.

The right password must be entered by the customer after successful authentication; else, the safe will lock..

## 3. CONCLUSIONS

A cutting-edge and safe technology called the fingerprint-based bank locker system gives customers quick and easy access to their lockers. The system uses very accurate and secure biometric authentication technology to confirm the user's identity. According to a literature review, the high level of security, user acceptance, and popularity of fingerprint-based bank locker systems has increased significantly in recent years. Client satisfaction and adoption rates have grown, and customers perceive the system to be simple to use, according to banks. While installing a fingerprint-based bank locker system, banks must take into account several factors, including cost, maintenance, and integration with current financial systems. Banks must make sure the system is compliant with their current security architecture and regulations. In conclusion, the fingerprint-based bank locker system is a good approach to secure bank lockers and give consumers a quick and easy way to access them. Both customers and banks profit from its high level of security and the removal of the need for physical keys. With more investigation and development, this technique might also be applied to safeguarding different kinds of assets

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