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A Survey on IOT based Secure Bank Locker System

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ABSTRACT: The objective of this paper is to have a survey on a bank locker security system using different technologies like Iris Scanner, Face Recognition, Fingerprint and passwords for securing valuable belongings in the locker. The bank customers are now more concern of their valuables like documents, jewellery, and many more material. The safest place to keep all such valuable is bank. With the development in security related technologies, the bank locker security system also need to be more secure and theft proof. This survey further lead to design of IoT based multilayer security system for bank lockers.

KEYWORDS: Fingerprint, IoT, Locker

I. INTRODUCTION

In present world, the safety and security is utmost priority for any bank vaults and locker systems. At present, bank uses passwords, keys, Personal Identification Numbers or identification cards for security of lockers. But, this systems have their own drawback. The cards can be stolen, and passwords and numbers can be guessed or slipped one's mind. The biometrics like fingerprint is more accurate method of recognizing a person based on a physiological or behavioral characteristic.

II. LITERATURE REVIEW

Arvasu Chikara, [1] described that a smart locker has been designed for banking sector. The main feature of this work is it keeps track of time, date and number of access of blocker by a user in the bank. The smart lock program will compare your image and fingerprint with the data already stored in the database. After checking the authenticity of the user, the microcontroller (Arduino) will give signal to the lock and it will open. It also gives a message when the number of permissible access turns increases in a given duration.

Ashutosh Gupta, Prerna Medhi, Sujata Pandey [2], describes a multilayer security system which can be used in Home, Bank Lockers etc. to prevent thefts. Multilayer security provided by the combination of three securities which is based on the sequence of (I) RFID, (II) password and (III) Biometric consecutively. All the three modules are controlled through a microcontroller. The Proposed system is more efficient and reliable due to multistage security and may not be breached with the combination of all three stages.

Raj Gusain [3], the objective of this paper is to design a bank locker security system which is using Face Recognition, Iris Scanner and Palm Vein Technology (PVR) for securing valuable belongings. A face recognition system is a system which identifies and authenticates the image of the authorized user by using MATLAB software. The images of a person entering unrestricted zone are taken by the camera and software compares the image with an existing database of valid users. Iris Recognition system uses generous characteristics present in human body. This technology is employed for biometric authentication in ATM's, Immigration & border control, public safety, hospitality and tourism etc. This paper serves techniques so that capability of palm vein recognition system can be improved using modified vascular pattern thinning algorithm. Palm Vein Recognition (PVR) is a technology which recognizes palm vein pattern of an individual and matches it with the data stored in database for authentication. This is a very reliable technique and has a very good accuracy and is considered as the most secure and better technique for security purposes.

A. Z. M. Tahmidul Kabir [4] presents, a security system for transporting or storing valuable while restricting unauthorized access. The system consists of Memory Module, PIR sensor, fingerprint security, Encoder-Decoder, RF module, GPS and

GSM module etc. to provide the maximum level of security.

The proposed security system can be a major uplift in transporting important documents, money or ornaments from one place to another especially for banks in transporting valuables as the proposed security system is designed in such away that the vault can only be opened by an authorized person, in specific places, using proper credentials, hence providing maximum security.

Santosh Mahendra [5] presents that, There is a sudden exponential use of security systems in our day to day life. For example, security in a business space, organization, or bank locker is important to every individual now. Lately, security cameras are being utilized in order to build safe and secure places in organizations. However, this technology needs a person regularly to detect any problem in the frame taken from the camera. The main aim of this paper is to enhance the traditional security system. The security system based on the IoT platform has the potential of interacting real-time with the device. The system consists of a camera, voice sensor/microphone, motion/activity sensor and an LTE/Wi-Fi module which is interfaced with the heart of the system, processor. This entire economic system using IoT in real-time will allow mobile devices and computers to remotely track the activities occurring at the location where the IoT device is placed and records all the activities, which will be saved on one's cloud storage account. The IoT based security system helps in added protection of the user/customer property. Security systems are designed to perform certain tasks when a secured zone is breached. In this paper, notification is sent to the concerned person as an alert where the user can take necessary actions. The main advantage of this system is the ability to remotely manage one's property 24/7. With this IoT based smart locker, one can monitor, get alerts, notify in case of emergency from anywhere in the world using mobile application via cloud connectivity 24/7. To be specific, we aim to design a light-weight, low cost, extensible, flexible wireless smart security system using IoT which employs the integration of various latest technologies. The combination of the various technologies can be used synergistically as a smart security to control a system in a house/organization (lock or unlock a system with the help of SMS/app) from remote locations. The complete system is designed considering all types of door locks and lockers by providing a simple, effective ease of installation, to provide homes/organizations extreme security and our system will be a means for preventing, detecting and counter-measuring robbery or burglary.

R. S. Divya [6], suggested that, In day to day life, security of an object or property plays a major role. Nowadays, security is the major threat faced by most of the organizations; hence security is gaining more importance in these days. This paper gives a survey on various automatic identification and access control mechanisms that have been used over the years to prevent unauthorized access. In olden days, for high security zones like locker rooms for banks, military sites etc, traditional lock systems or passwords were employed. But this solution was not secure. Due to the advancements in technology RFID cards were used, but this was not useful for the user due to the chance of getting lost, forgotten or stolen. Later various door lock security systems based on biometrics, GSM, OTP, cryptography etc were developed. A lot of research is going on various automatic door lock systems and can expect more secure systems in the upcoming years.

Prof.K.D.Mahajan [7] proposed that, The value of biometrics have been realised by security system for two main purposes i.e to identify and to verify users. There are many places where only authorized people can enter and in that situation we need to identify person entering restricted areas like bank lockers, military base stations, R&D labs etc. If process of identification is performed by security guards manually, it will be difficult to identify each person. Also these processes are time consuming and there are chances of many errors. To avoid these problems we are proposing a three layered security system for bank locker based on iris recognition, fingerprint detection and OTP which will recognize the person. This is a biometric system for access control that uses the most unique characteristic of the human body, the iris and the fingerprint, employed in automated border crossings, national ID systems, etc. The proposed system will provide information of recognized person & thus controlling the access of the people into the restricted area.

Satvik Gogineni, K Marimuthu, and Syed AmmaShei, [8] suggested that, oday security is a main issue for protecting the resources. Security is important because risk of intrusion and theft has become increasing. Security is also necessary for protecting banks from fire and other abnormal activities. Many people are using various types of security systems. We have found that most of the security systems are developed only for alarm using microcontrollers; in our research we use Microcontrollers with different sensors (PIR, Smoke or Fire, IR and Gas) as observatory to detect or identify intruder or abnormal activities inside the bank and ATM. The main aim of this research is to design a system for alerting theft and to auto arrest the thief in bank or ATM itself from centralized monitoring unit. The purpose of the system is to design a smart and centralized monitoring and control system using IOT technologies.

SandipDutta; NitinPandey; Sunil Kumar Khatri [9], presents that, Security Systems plays a very important role in today's modernized industrialized era. Throughout our life, the hard earned assets and valuables things are expected to be safeguarded under certain security features which meet the inquest of the requisite. It is basically designed in order to avoid the risk of vulnerabilities to our valuable items. In this technological world, the system includes biometrics along with digital code lock which response in the way for matching or mismatching the code. Any mismatch to the series of authentication during verification is done raises an alert sound. For biometrical analysis Iris scanner and vein detector is being used which will be monitored with the help of microcontroller through the sensors of the biometric sensors. A keypad will be used for the registered codes such as unique passwords and registered number followed by a wireless motion detector. Any movement occurs to the output of wireless motion detector will be easily sensed by the microcontroller resulting an alert sound. For best assurance, this process of secured authenticity will be active 24x7 that includes at night time as well.

Ajay Kumar; PriyanSood; Utkarsh Gupta [10], with the contemporary amelioration of web and diversification of systems administration, organizing is capacitated on regular gizmos through the Internet of Things (IoT). Over the most recent few years, IoT is expeditiously flourishing over the globe. The idea is to develop a Bank Locker Security system that permits the manager to see the occurrences from an isolated area and catch the frame depending on its advantage. This will be assimilated by planning site pages, connecting them with the database, picture catching by raspberry pi, face acknowledgment, face discovery, structuring of the application and permitting/denying the client entry.

Salma Mohammed; Abdul Hakim Alkeelani [11], presents the main purpose of this paper is to design and implement a system based on a Password and a Radio-Frequency Identification RFID. This system is basically a password and an RFID based access-control system which permits only an authentic person to unlock. For doing this, the system will activate and authenticate the user. We have applied a security system via a passive type of RFID and a PASSWORD based on Atmega16 microcontroller. The RFID reader reads the ID number form RFID tag. Then enter the password from a Keypad, if the ID number of the tag and the password are correct, then the will unlock. The aim of constructing this system is to put in place a formidable locker security system with low cost and free of errors.

Jannatul Bake Billa; AnikaNawar; Md. MarufHasanShakil; Amit Kumar Das [12], presents, Password has become a critical part of one's personal, social, and professional life. We need passwords to secure personal information regardless of the platform. People need passwords for almost every system they use. Secured passwords are hard to generate. It is harder to remember and manage them. Password managers claim immense importance in this circumstance, but not all the password managers available to use can always provide the proper security for the passwords and other information given to them. Those are vulnerable when it comes to protecting the information from hackers. This paper presents a proposition of a new and improved approach for password management systems. This approach does not need to store the password anywhere like the existing ones. It will only save three parameters set by the user to identify them in the local storage of the device where they installed the system. Our hope is, the system should provide the users with a safer feeling to use password manager systems as it becomes more secured and non-volatile.

Hitesh Prasad; R. K. Sharma; Uddish Saini [13] presents, Electronic Locker is a system that is used to secure your valuable things. In this paper, an electronic lock that lock or unlock by correct sequence of four-digit key or password. These key or password can be changed at any time. Also, if a wrong key sequence is entered, then it will produce an alarm signal. Along with these if user take more than 10 seconds to press two subsequent correct keys, then it will produce a timed- out signal. The complete design of Electronic Locker is developed using Finite State Machine (FSM) and has been written in Verilog HDL (Hardware Description Language). Also, the complete design is simulated and synthesized in Xilinx ISE design suit. The complete design is also implemented on Artrix7 DDR4 FPGA hardware board.

Prajwal D [14] et al. proposed the need of a bank customer, who waits for an authorized bank staff, to open the customer's bank locker with a master-key. To resolve this issue, we have proposed a locker system, based on RFID and Password technology. This system also finds its application in house safes, Smart cash box, offices, etc to safe guard valuables. When a customer steps in front of locker room the IR sensor gets activated and the customer needs to give the access card, if the customer fails to do so in 60 seconds the buzzer gets activated, only authenticated person can enter the locker room. Once the customer is inside the locker room, the customer is again asked to give the access card for their respective locker. If the customer is authenticated, they are required to enter the correct password, otherwise safe gets locked.

Pooja K M [15] et al. proposed a bank locker security system based on Finger print and OTP technology. This can be organized in bank, offices and homes. In this system only the authenticate person recover the documents or money from the lockers. In this security system fingerprint and OTP is used. In this system first person enroll user name and password and mobile number. If user name and password matches then Finger of person will detect and store with ID. If the ID gets matches. Then four digit code will be sent on authorized person mobile to unlock. So biometric and Bluetooth security is more advantages than other system. This system can also create a log containing check in and checkout of each user along with basic information.

Ambrish Kumar [16] et al. proposed as today fingerprint based system provides high accuracy in terms of security. Also there is a high demand for integration of fingerprint matching techniques for making secure authentication systems. This research paper introduces this door locker system which integrates fingerprint reader in it so as to provide a good level of security. The main goal of fingerprint door locker with image capture project is to provide security with no manual security flaws. It is easy to use and requires no special training or equipment. This system needs fingerprint authentication while operating the door locker as well as captures the images of person who is handling the locker and saves it in memory card which can be later viewed with card reader to the authorized person. The functionality of system is that it will scan the fingerprint and if it matches with registered fingerprint the locker opens and also captures the image of user. The system uses an atmega 328 microcontroller for this purpose. The microcontroller processes data sent by the access. Controller operates the motors to open the locker door on encountering registered valid users. If the fingerprint does not match with register fingerprint of user, it will show the error message as unauthorized user and immediately saves the picture in memory card. So, the system is very beneficial for stopping the robbery by providing security.

Guo Chun Wan; Chao Wang; Jian Zhou [17] suggested that, In rapidly-developing technological world, 'Home Security' is getting more and more attention in normal life. The challenge to developing various home security devices is not only ensuring security and safety of users and their home, but also making devices convenience and intelligence. It is important to improve the usability of the intelligent door-lock system as the first entrance of a smart-home. This paper proposes a novel intelligent door-lock system and management system. The design scheme of the system mainly adopts the idea of modular design, dividing the whole system into fingerprint module, RFID module, password module, display module sleep module and communication and client module and other sub-modules.

M Shanthini; G Vidya; R Arun [18] suggested that, In recent trends, smart buildings have become the base for the Internet of Things (IoT). The usage of the internet is increased by connecting the devices in the homes to make the places more comfortable, provident, delightful, and secure. The proposed approach addresses a security aspect in smart home technologies, namely the door lock system. The door lock system determines the security by allowing the owner to monitor the buildings with a Smartphone-controlled, Bluetooth-connected system using Arduino UNO. Users can open or close the door lock by installing the developed android application in devices like tablets, smartphones, laptops, etc. by providing the login credentials like username and password which is verified in the database over the internet. If the credentials are invalid, the buzzer rings and an SMS alert is sent to the owner of the building which enhances the security. This approach can further be scaled to commercial sectors like ATMs, vending machines, etc. by using other wireless communication.

III. CONCLUSIONS

In this paper, we have studied various locker management techniques and technologies. We can conclude that, the system need to be robust, efficient, easy to maintain and durable. The log of the customers accessing the locker with date and time is also required. All this will help banks to utilize enormous manpower wasted for maintaining locker system in banking sector. For making this system safer as it is related to banking sector we added fingerprint authentication hardware setup which work in sync IoT part. Hence this will help banks to automate their locker system.

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