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Review of Bank Locker System Using Embedded System

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Abstract: In this review paper various bank locker security system designs are explained. In today's high-speed world, security plays significant role. People are now more concern of their belongings like valuable documents, jewelry, and many more material. The safest place to keep all such valuable is bank. With the advancement in technology there are many system designed to keep bank lockers safe.

Keywords: GSM, Fingerprint, motion sensor, electronic nose.

I. INTRODUCTION

Bank is an institute where we keep our money and other valuables. Where there is money there are thief, now days there are more cases of burglary so securing bank has become very important. With growing development in electronics security system today all manual locks are replaced by electronic gadgets. These gadgets include various technologies like motion sensor, odor identification, face recognition, fingerprint scan, RFID, GSM and many more. All these technologies used for security of bank lockers have their own pros and cons.

II. LITERATURE SURVEY

A. Security using odor identification and security questions

Identification of odor and security question is an extra level security system to verify the identity of a person. In one of the paper based on bank locker security system this technique is used along with RFID. Everyone in this world has its distinctive odor, which helps the system to distinguish and identify persons. Every time a person has to access his locker, has to undergo through this test. Initially questions are set for security reasons. If the holder answers the questions asked by the system, and if the answers are right then the holder has to follow odor test. Whenever a person opens a bank locker account in a bank, his or her odor pattern is stored in the data base of bank system.

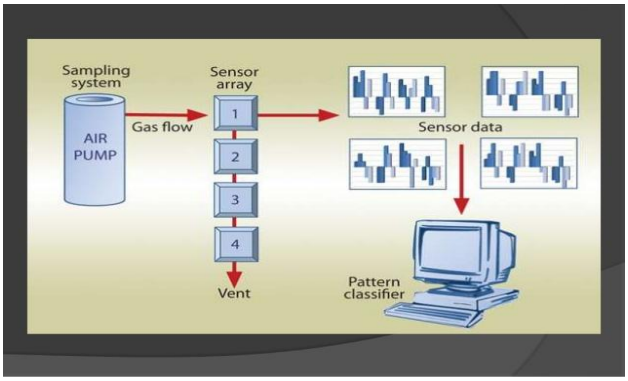

Fig.1.Odor detection steps

This technique of odor identification uses a device knows as electronic nose. Electronic nose is based on the technology of e-sensing that uses sensing arrays and pattern recognition methods to reproduce human sense of sensing smell. There are many sensors in electronic nose like MOSFET, conducting polymers, quartz crystal microbalance. In this system, bank locker account holder does his registration, at the time of registration odor of holder is saved. Whenever locker account holder wants to access locker, odor is tested through electronic nose which is interfaced to a microprocessor where the odor is compared with the previous odor data base that was taken at the time when bank locker holder did his registration.

B. Security using pattern analyzer

In this system various levels of security are implemented. One security level is on machine side and other level is on door side. Here authentication of a person is done by RFID tag and a camera. When a person has to access the locker he has to swipe his tag. Along with RFID one more authentication level is there. Camera which is installed in strong room captures pattern password using OPEN CV to compare and recognize user pattern for authentication. The other level of security is implemented with the help of sensors like vibration sensors and temperature sensors near door for security issues.

Fig.2. CCTV camera

C. Security using Near Field Communication (NFC)

In this bank locker security system, NFC a near field communication technology along with a fingerprint scanner is used. Now days all smart phone consist of NFC feature inbuilt in them. NFC is a technology in which information is transferred wirelessly when a device having NFC is brought near to other device. In this system NFC

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smart phone is interfaced with a micro controller module. Locker holder has to first place his thumb on fingerprint scanner in Smart phone, once this fingerprint is scanned and found correct, a password is generated.

Fig.3. Smartphone using NFC

D. Security using motion sensor

One of the key player technologies in security system is motion sensor. The motion sensor is a device used to detect motions or different movements in the area around it. The main function of such sensors is to detect intruder when there is no one in organization or home or any institute. Motion sensors stand guard by alerting the control panel system by sending signals whenever the sensor get tripped by changes in motion. There are various types of motion sensors like passive motion sensor and active motion sensor. Active motion sensor emits various energy signals like sound signals, infrared signal, and microwave signal. Also few sensors use vibrations, ultrasonic waves to detect motions.

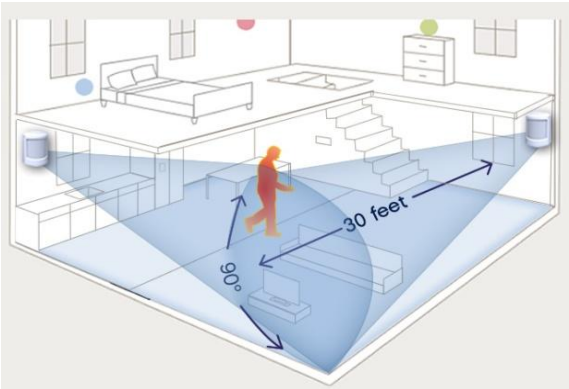

Fig.4. Use of Motion Sensor

E. Security using PIR and IR sensor

In this system two levels security protection is used. One security level uses PIR motion detection sensor and other level uses IR proximity detection. Here Programmable system on chip (PSoC) technology is used to interface these two detection algorithms. PIR is a passive infrared motion sensor used to detect infrared light waves emitting from objects around it. IR proximity sensor detects objects closer to the sensor. The main component in IR sensor is IR LED which radiates infrared radiations that are reflected when an object is in vicinity of sensor. However this system suffers a drawback as there are some color, some objects that absorbs infrared waves and thus there is no reflection.

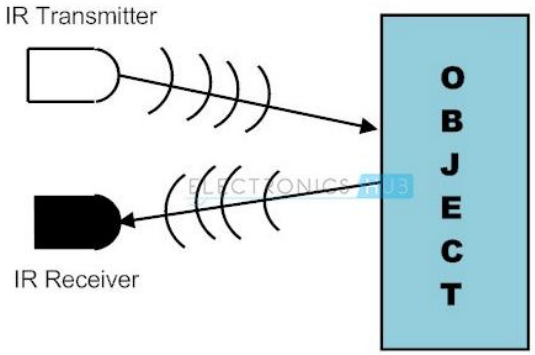

Fig.5. IR sensor

F. Security using heat sensor, RFID, GSM

In this system along with RFID tag, heat sensor and GSM is used. Initially locker holder has to swipe his RFID tag which consists of information about bank locker holder like locker number and other details. Once the tag is recognized as valid tag, bank manager will provide respective locker through conveyer setup. Apart from this if somebody tries to open the locker through machine or any instrument, then that theft is detected by heat sensor. As burglar will use some sort of instrument then temperature will be increase, and this rise in temperature will be sensed and an alarm will trigger.

G. Security using Face recognition

This system uses face recognition technology to recognize a person, whether he is a bank holder or thief. Every bank has camera system implemented. When a person enters strong room of bank locker, camera present in bank locker captures image of the person. The captured image of the person is given as input to one of the face recognition algorithm. Among various facial features skin color is used here to recognize person. However this system has drawbacks due to difference in facial expression, image orientation, also this system has to maintain huge database.

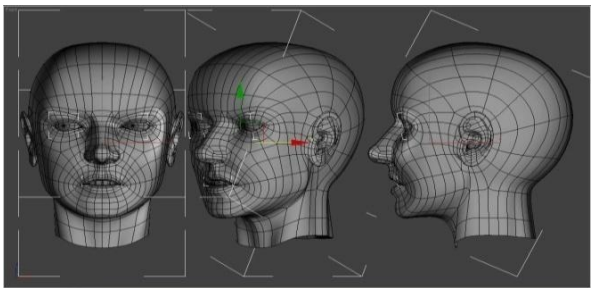

Fig.6. Face Recognition

H. Security using Fingerprint scan, IRIS scans

In this system a three level security system is designed. One level uses RFID, second level uses fingerprint scanner and third level uses IRIS identification. At initial stage user has to swipe RFID tag, if the tag is valid then LCD display ask to place finger on fingerprint scanner. If the

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fingerprint scan is accepted then user has to go through third security level of IRIS scan. IRIS scan technology is one of the biometric technologies that use pattern recognition technique to identify patterns of a person's retina. Here the person has to bring his eye in front of a camera. The capture eye pattern then will be compared to the eye pattern stored in database. The match if found valid, person will be allowed to access hi locker otherwise bank manager will stop whole procedure. However this fingerprint scan and IRIS scan at initial stage will consume time, as customer will have to follow all this procedure.

Fig.7. Fingerprint scan

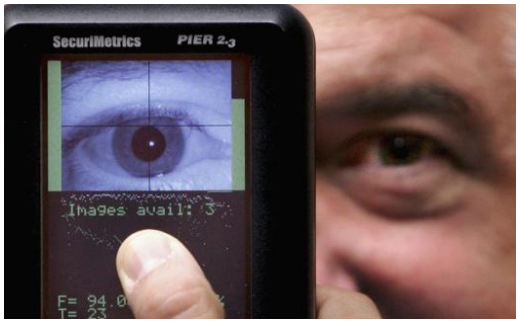

Fig.8. IRIS Scan

I. Security using LDR and GSM

In this system GSM and LDR is used.LDR a light dependent resistor also known as photo resistor works on the principle of photoconductivity. The resistance of LDR decreases with increasing intensity of light when light is incident on it. Lockers in banks are kept in strong room where there is no sufficient light. Also when locker is closed there is no light inside locker. For security of locker, LDR circuit is designed to detect whether locker is open or close.

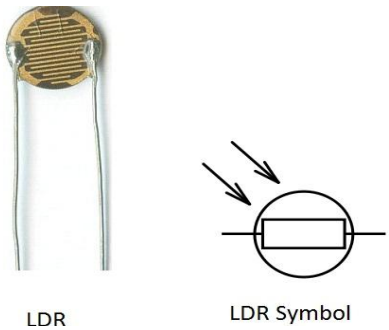

Fig.9. LDR

When account holder opens locker, light rays enters locker and LDR is affected by light, it then transmits a signal to controller and through GSM, controller will send message to locker holder.

III. PROPOSED SYSTEM

Here we are implementing a locker security system by using RFID and GSM technology. RFID is a wireless technology of identifying objects with the help of radio waves. Main components of RFID are RFID tag, RFID reader, and antenna. RFID tag consists of information of locker holder. This tag has two main components antenna, integrated circuit. In order to transmit and receive information to controller RFID reader is used. Thus RFID reader is middle man between tag and controlling unit of locker system and hence it also consists of antenna, RS 232 cable and related circuitry. Locker account holder will have RFID tag which will contain information about bank locker holder like his name, locker number and like information. Whenever user has to access locker, he has to first swipe RFID tag.

Fig.10. RFID tag

If the tag is valid then user has to enter password through keypad. If the entered password is correct then locker will be opened. If the entered password is wrong then buzzer will be on indicating in authenticate user is accessing the locker. All these activities are informed to user with the help of message through GSM technology. GSM is a second generation digital cellular mobile system used to send text messages, calling. GSM is also integrated to microcontroller to send message of activities. Thus here a simple and convenient two level security is used to protect bank locker security, first using RFID tag and other through password. As only two technologies are used it is available to users at affordable price. Also because of simple circuitry there is less maintenance. Besides this there are some limitations like user has to remember password also there might be time delay in delivery of message due to poor network.

IV. CONCLUSION

Thus it is a real time embedded system providing security to bank lockers and like systems. As the system consists of components like RFID and GSM, system is cost effective, and easy to handle. Thus this system is an ideal way of securing bank lockers.

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It provides assurance to bank locker holders that only authenticate users can access lockers thus overcoming all possible frauds.

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