

Biometric Finger Vein based Bank Security System Using ARDUINO and GSM Technology

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Abstract

The principle aim of this project is to decrease the cause of thefts that are occurring in our day to day life in bank locker security systems. Biometric finger vein bank locker security system provides access for only authorized users. It prevents the concept of proxy as finger veins are one of the biometric and are unique for an individual. It deals with ARDUINO and GSM Technology. In this system, bank officials will collect the biometric data from the authentic person and feeds them to the required database. This gives access only for authentic person and proxy can be eliminated.

Keywords:- Finger vein, Authorized, Authentic, ARDUINO, GSM technology.

INTRODUCTION

At present age, safety has become a necessary issue for most of the people mainly in the rural and urban areas. Some people are more concerned about their safety for their expensive things like jewellery, money, valuable documents, etc. So the bank lockers are the safest place to accumulate them but the conventional security system is not providing the higher security because in conventional security system a user can open the lockers using keys. Sometimes the keys could be stolen. Then the user has to apply for original keys but the time period is longer to get new keys so in it Biometric is considered as one of the most effective methods when it comes to high security. Biometric is an automated technique of recognizing a person based on his physical attributes which includes face, fingerprint, hand geometry, handwriting, iris, retinal, vein, and voice. Biometric data are considered as a place of using this security system we have implemented the new system. The system is biometric finger vein using ARDUINO and GSM technology based security system which provides more security than conventional system. In this paper we have implemented security of the money in the bank locker, house, and workplace (treasury) by using biometric finger vein and GSM technology which will be more protected than other

systems. The finger vein module gives access for only authorized persons

Different and distinct from personal information because it cannot be reverse-engineered to recreate any personal information and cannot be stolen to attempt theft. Fingerprints are the most common biometric technology used in many applications.

The finger vein recognition and matching is one of the highly secured priority ways of verifying a person's identity. It requires the imaging and comparison of vein patterns which includes the ridges & minute points. They are unique for every individual.

LITERATURE SURVEY

BETHANNEY JANNEY.J prepared a finger vein recognition system for authentication of patient data in hospital. The system is proposed for database authentication in hospitals. The system is applied on an embedded platform and executed with a novel finger vein matching algorithm. The different components in the system include image ACQUISITION, finger vein matching module, Controller Board and communication unit. The finger vein matching module directly gives the data of finger vein and will be analyzed using discrete wavelet transform (DWT) in MATLAB. Matching the finger vein image with the database image is the main stage to verify person authentication to access the patient details. The method aims to implement the secured patient database in hospitals using a finger vein authentication system. The designed system is a low cost, low power consuming device. It includes detail description of hardware finger vein recognition system. It consists of finger vein matching module, image acquisition unit, Controller Board and communication unit [1].

SHABAB BAZRAKAN, TUDOR NEDELCO, CLAUDIA COSTACHE and Peter Corcoran prepared a finger vein biometric smart phone footprint prototype with vein map extraction using computational imaging techniques. Biometric systems are of increasing interest for consumer devices, in

particular handheld devices namely smart phones. One important point that they considered is to protect private data. The private data can be accessed by the authentic individual only my biometric. In this they managed finger intermediate phalange veins to extract by using a relatively setup for the biometric finger vein authentication [2].

N VENKATA VARA PRASAD and K VENKATA MURALI MOHAN prepared a real time embedded finger vein recognition system for authentication of mobile devices. They proposed the finger vein recognition system and vein image extraction on an embedded platform. It includes a device for capturing of finger vein and an algorithm for extracting finger vein images by considering various parameters. The parameters to be considered are vein width, length, position and pixels. They designed for providing better security for the private data that we store such as mobile phones, bank lockers, etc [3]. K.D. Mahajan proposed a three layered security system for bank locker. The main aim is to develop high security systems. This involves iris recognition, fingerprint recognition and OTP based security alert. They proposed to reduce the time and decrease the proxy levels by comparing with individuals in security checks. There are many steps involved such as iris segmentation, iris normalization, feature encoding, template matching, accept/reject decision. They used both raspberry pi and ARDUINO. Their main aim is to secure R&D labs and military base stations [4].

M.SOWNDARYA, J.ROHINI, V.PAVITHRA and S.NITHYA prepared an advanced security system using finger vein recognition. They proposed this just by keeping in mind to decrease the crime rate and robbery especially in banks these days. Finger vein is a major keyword that plays a major role in the whole scenario. Because finger vein pattern can only be taken from a live body. As vein is hidden inside body and is invisible to human eyes, duplication is impossible. That means there is no chance of proxy. It is highly secured. It is implemented by capturing invasively without any unpleasant sensations and contagion. They are all carried with the help of an image acquisition unit, ARM controller and human machine communication unit. When Finger vein matches it gives access to the authorized person [5].

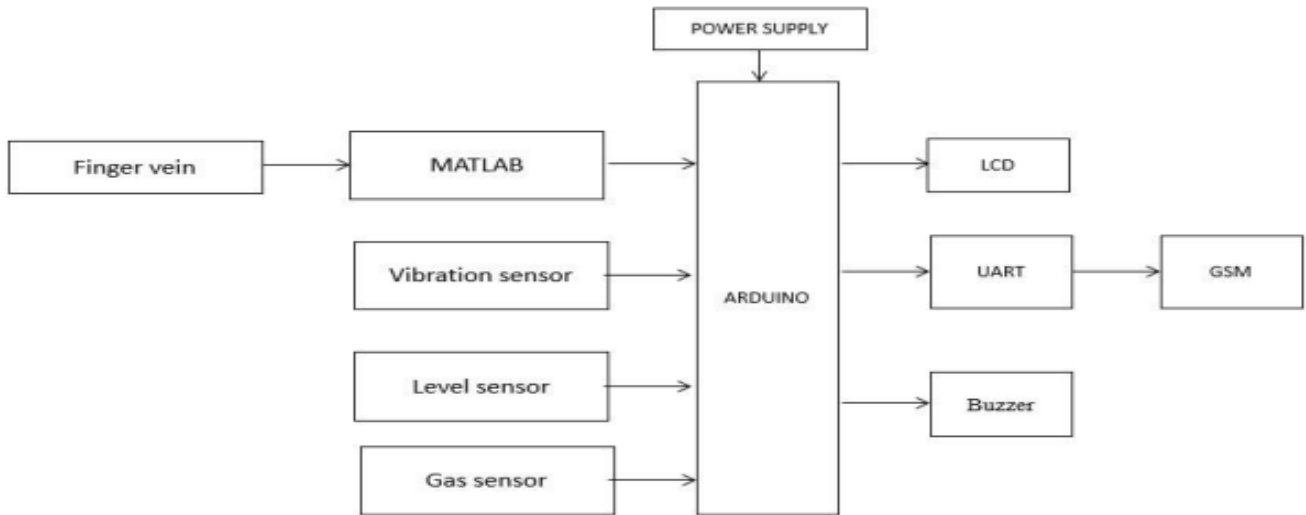
EXISTING SYSTEM

The purpose of the existing system is to increase the security for lockers because conventional banks lockers are not secure so to rectify the problem which we discuss above we are implementing this project. In this project each locker has separate fingerprint module for opening the locker. Users scan their fingerprint. After scanning process complicated user enters their password with the help of keypad then their particular locker is opened. After the work has been completed if key is pressed again with help of keypad the locker door will be closed again. If an Unauthorized person

tries to check his fingerprint image then a signal will be given by a buzzer which is interfaced to the controller and also if incorrect password is entered by the user again indication will be given by the buzzer. And we are using GSM modem to send the message on mobile of manager. Recent days security systems plays a crucial role at many places like banks, industries etc. There are many banks using authorize access control approach to prevent the locker room from unauthorized access. It uses the Bluetooth communication. In this project highly reliable, multilevel and most efficient locker room security system has been designed. A Multilayer Bank Security System is a system for validating, monitoring and controlling the security at bank locker rooms. The system includes a biometric system, i.e. a fingerprint scanner and a password which is responsible for the security of the personal locker. The system uses fingerprint sensing to read fingerprints and first store registered fingerprints against the bank locker record. Now next time a person scans finger the sensor reads it and compares it with past records. Now if match is found with existing prints, it sends the match signal to the microcontroller and the controller displays this data on the LCD display. Also the controller drives the driver motor to open the bank locker door and opens it for authorized customers. The door of locker want opens for unauthorized customers. The system uses fingerprint sensing to read fingerprints and first store registered fingerprints against the bank locker record. Now next time a person scans finger the sensor reads it and compares it with past records. Now if match is found with existing prints, it sends the match signal to the microcontroller and the controller displays this data on the LCD display. Also the controller drives the driver motor to open the bank locker door and opens it for authorized customers. The door of locker want opens for unauthorized customers. The microcontroller performs all the necessary operation where fingerprint module is given in input pins and buzzer, LCD display, etc are connected to outputs. The main drawback is the locker password can't be set to any complex level and length with no restrictions. The passwords can be hacked and then there is a proxy of fingerprints. This can be rectified from our project because there is no chance of prosing the finger vein.

PROPOSED SYSTEM

The finger vein based bank locker system is an enhancement to the original bank locker system that uses Fingerprint. Now-a-days, there is a problem of fingerprint proxy. Because proxy has become a common thing in day to day life of a human. Well finger vein based bank locker system is here now to fix each one of these issues. The finger vein authenticated bank locker system is safe along with user friendly and maintain. If the person finger vein is matched with the banks database, the locker door gets opened. If it is not matched automatically buzzer gets activated that some unauthorized usage was occurred to that system.

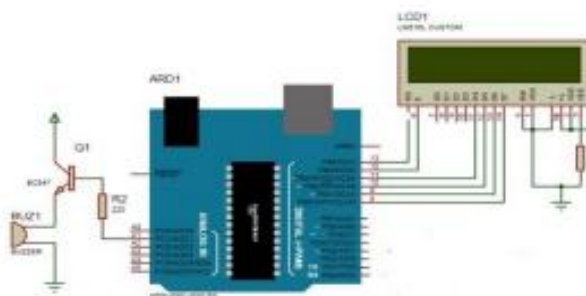
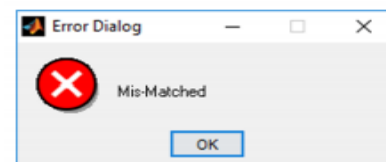
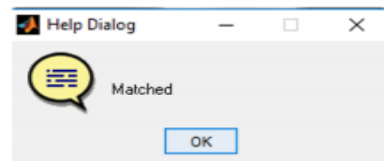
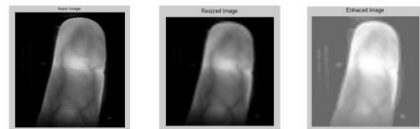


BLOCK DIAGRAM OF BIOMETRIC FINGERVEIN BASED BANK LOCKER SECURITY SYSTEM USING ARDUINO AND GSM TECHNOLOGY

First the image gets captured with the help of finger vein module and its get processed with the help of MATLAB. The input image gets resized and gets enhanced with help of MATLAB codes. The image gets checked with the banks database and gives whether the finger vein gets matched or not. It gets display on the LCD which is interlinked to the ARDUINO. Whereas the task of vibration sensor is to detect whether there is any unequal movement of locker and gives a message on LCD that vibration detected and buzzer gets activated and the same time phone call alert goes to the authorized user with the help of GSM technology. The same with the gas sensor to detect the gas levels in room. Level sensor is used to detect the presence of any water. At normal stage, the LCD gives the normal level and gas level on LCD. With those components we can provide a highly secured bank locker system.

with respectively to whether the finger vein matched or finger vein mismatched. LCD also displays the water level and gas level default and if vibration gets detected it displays vibration detected.

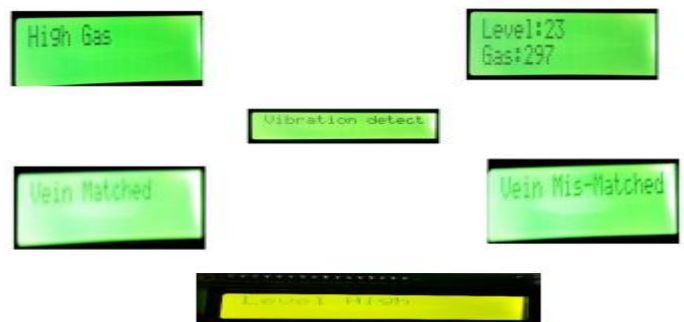
FINAL OUTPUT



LCD CONNECTION TO ARDUINO

RESULT

When the finger is placed, the image of finger is captured and resized and gets enhanced. A dialog box is appeared that the image is matched when it gets matched with the image in database. Likewise a dialog box is appeared when the image gets mismatched. The LCD will display the required content



CONCLUSION

The Biometric finger vein bank locker system is a highly secured bank locker system which can provide access to only authorized persons and it prevents the concept of proxy because finger veins are unique for an individual. It can be employed in banking & finance, retail ATM, etc.

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