Iot Based Security System for bank Vaults

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Abstract: The main objective of our paper is to design and implement a bank vault security system based on IOT technology. The proposed system is designed which implements a security system to handle the cash lockers by the authorized person. It is developed using Arduino Microcontroller which is interfaced to the RFID reader to read the code, keypad module for password authentication and camera module for face recognition. If unauthorized person tries to break or open the lock, it is automatically monitored and detected using embedded and IOT technology. After detection, GSM and IOT module is used to send information immediately to the respective authorities and the person is captured. The proposed system found to be cost effective with better performance and easy to implement.
Keywords: Micro controller, RFID, GSM, Keypad, Facial recognition.

1. Introduction

Bank is a place which provides us financial services like issuing money, protection to valuables etc. Earning money is important more than that saving the money is important to make the economic status of every human comfortable, hence bank play several role. Increase in threats against bank the fts is common no wadays In spite of high security measures. Increasing crimes in banks has become a serious issue. The existing system contains only password authentication, keys, and fingerprint recognition to open lockers. This system only opens the lockers when authentications are matched. If any on etries to breaker access the cash locker, there is only alarm which indicates the threat and the action is not taken immediately. Hence the proposed system is designed using embedded and IOT technology to ensure safe and secure access to a bank locker from a authorized user by the following security check levels-: RFID authentication, Password authenticate, Face recognition, GSM and IOT. If any one of authentication is mismatched the person can't able to access the locker and if the person try to break the locker, immediately information will be sent to authorities and the unauthorized person made unconscious to hold that person. Hence the proposed system is more efficient to give safe and secure bank locker system.

2. Methodology

The authentication follows three stages in which first stage the RFID reader reads the RFID ID card provided to the user by authorities if the RFID number matched with the RFID numbers stored in the data base in Microcontroller then RFID authentication is successful and it moves to next stage of authentication that is password. In this the use renters the password through the provided keypad if the password matches with the password stored in the database in Microcontroller then password authentication is success fuel and it moves to next stage face recognition. In this camera reads the face and compare it with data base and if the face matched then face recognition is success fuel and locker can be accessed by the use. If anyone of authentication failed then the process will best opted in that stage itself. If any unauthorized person tries to access the locker by breaking it then vibration sensors sense the vibration then alarm is turned on and it sends the message to nearby police station and authorities to alert them that some unauthorized person is trying to access the locker. Simultaneously it closes the locker room with iron grid and release Ames the tic gas which make the person to be unconscious for some time. And this locker can be monitored through IOT.
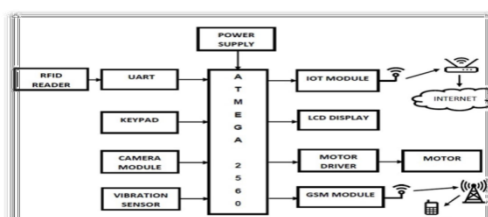
3. Block diagram

FIGURE 1. Block Diagram

Hardware Description: Microcontroller–Arduino Mega

FIGURE 2. Arduino Mega

The Arduino mega 2560 is a 8 bit microcontroller which contains 54 digital I/O pins in that 15 pins can be used for PWM

FIGURE 3. ESP 32

Function, 16 Analog pins and 4 UART pins. This Arduino mega runs on 16 MHz crystal oscillator. This Microcontroller can be operated between 5v to 12 v power supply. The Microcontroller board can be programmed by using USB connector. Came ra and IOT module ESP32 CAMisasmallcameramodulebasedonESP32. Then came raov 2640 is used for image capturing.ThisESP32 CAM has inbuilt WIFI module and Bluetooth module and contains 16 GPIO pins. The module can also store the captured image in SD card with the help of SD card slot present in the module.

FIGURE 4. RFID reader

RFID reader: The EM18 is the RFID reader module we use to read the RFID card. This module reads the data of RFID card of 12byte and that is transmitted to Microcontroller through UART protocol. The frequency of the EM18 ranges from 120kHzto 150 kHz so it can read from distance of 5to 20cm.
Key pad

FIGURE 5. Key pad

This 4x4 matrix key board which contains 16 keys. Each key represents separate data. By making either row beige hand the column to be grounded so whenever the key pressed the microcontroller can know at what row and column key is pressed.
Vibration Sensor

FIGURE 6. Vibration Sensor

The SW820p used to sense the vibration. Which contains the spring mechanism inside of it? Normally the sensor set to be high if any vibration applied on that the current will be disturbed hence by that phenol means the microcontroller detects the vibration.

GSM Module

FIGURE 7. GSM Module

The SIM800L GSM/GPRS module used to send the alert messages through the cellular network. It is like miniature mobile phones were we can connect microphone and speakers also it has ability to call. Nowadays this module can also be used to connect with internet for IOT projects.
LCD Display

FIGURE 8. LCD Displays

The LCD stands for Liquid crystal display used to display the data's. The 16x2 lcd display which has 2 rows and 16column hence 32 digits can be displayed the lcd can read either 4 bits or LSB or MSB to display the data so the trans mission is fast. The I2Cprotocolc can also be used.

4. Software description

Arduinoide: The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, message area, a text console, a tool bar with buttons for common functions and as eries of menus. It connects to the Arduino hard ware to up load programs and communicate with them.
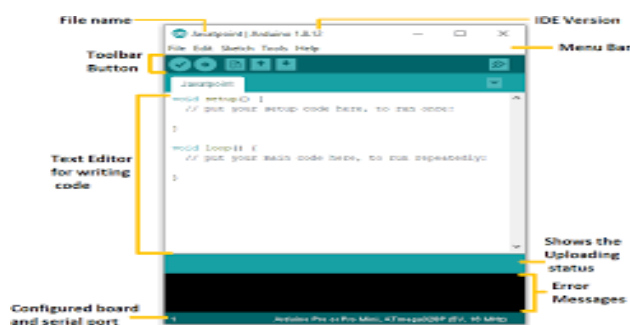
FIGURE 9. Arduinoide Ui

Result: The bank Vault has opened if all the input data are correct and if vibration sensor senses any vibration above the threshold range the microcontroller automatically close the grid and release the A anesthetic as in the room.

5. Conclusion and future Enhancement

By using this RFID system, password authentication, face recognition, GSM technology and IOT technologyanauthorizedpersoncanonlyopenthelockerandcollectthemoney.HereweusedArduinoMicrocontrollerhenceitisa low cost equipment, low in power consumption, compact in size, wide operating range, highly secured and reliable and-alone unique system. In future the

system can be handed to improve security in handling ATM by unauthorized persons and mishandling. Also technology can be improved to increase the reliability and performance against crimes in handling bank lockers.

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