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Smart Anti-Theft ATM Security system using Raspberrypi

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ABSTRACT: Now a days more number of ATM robberies occurs due to lack of security as ATM's equipped with money. This project deals with prevention of ATM theft from robberies by overcoming the drawback found in existing technology in our society. Whenever a thief wants to steal the money present in the ATM centers by using any physical equipment (vibration based/temperature based) then the ATM center door gets closed. The buzzer rings and the LCD display will display the alert message to the outside persons. Gas is released in the ATM center. SMS and location are sent to the nearby police station and the corresponding bank. In case without using any physical equipment the thief wants to steal the money using any other techniques the camera captures that person's pictures and compares with the stored images (Bank authorities) already present in database. If they both will not match then the above mentioned operations are performed here. A WIFI based app is used to open the doors by the cops and bank authorities. By this, the loss of money will be minimized. Thus the proposed system provides the highest security to the ATM's.

KEYWORDS: Raspberrypi, Vibration sensor, Temperature Sensor, GSM, GPS, Servo Motor, Buzzer, Driver IC, LCD display, Camera.

I. INTRODUCTION

In our society, more number of ATM robberies are occurring due to lack of high degree of security. Our idea deals with the providing security to the ATM centers by overcoming the drawbacks present in existing technology. Whenever a thief wants to steal the money present in the ATM centers by using any physical equipment (vibration based/temperature based) then the temperature sensor sensed the temperature or the vibration sensor sensed the vibrations, then these sensors send the signals to the raspberry pi, the raspberry pi sends the signals to the servo motor to shut down the doors. Then the ATM center door gets closed. After that the buzzer rings and the LCD display will display the alert message to the outside persons. By using Motor drivers the toxic gas such as chloroform will be released inside the ATM center. GSM is used to send the theft message and GPS is used to send location of the theft ATM center to the nearby police station and the corresponding bank. In case without using any physical equipment the thief wants to steal the money using any other techniques the camera captures that person's pictures and compares with the stored images (Bank authorities) already present in database. If they both will not match then the above mentioned operations are performed here. WIFI based app is used to open the doors by the cops and bank authorities. By this, the loss of money will be minimized. Thus the proposed system provides the highest security to the ATM's

II. METHODOLOGY

This system is used to monitor the ATM centers. If any robberies occur doors will be closed, the toxic gas will be released. The theft SMS and location will be sent to the nearby police station and bank authorities. So, we can easily catch the thief and also easily recover the money. Here the Block Diagram of Smart Anti-theft ATM Security System Using Raspberry Pi is shown in Fig. 1.

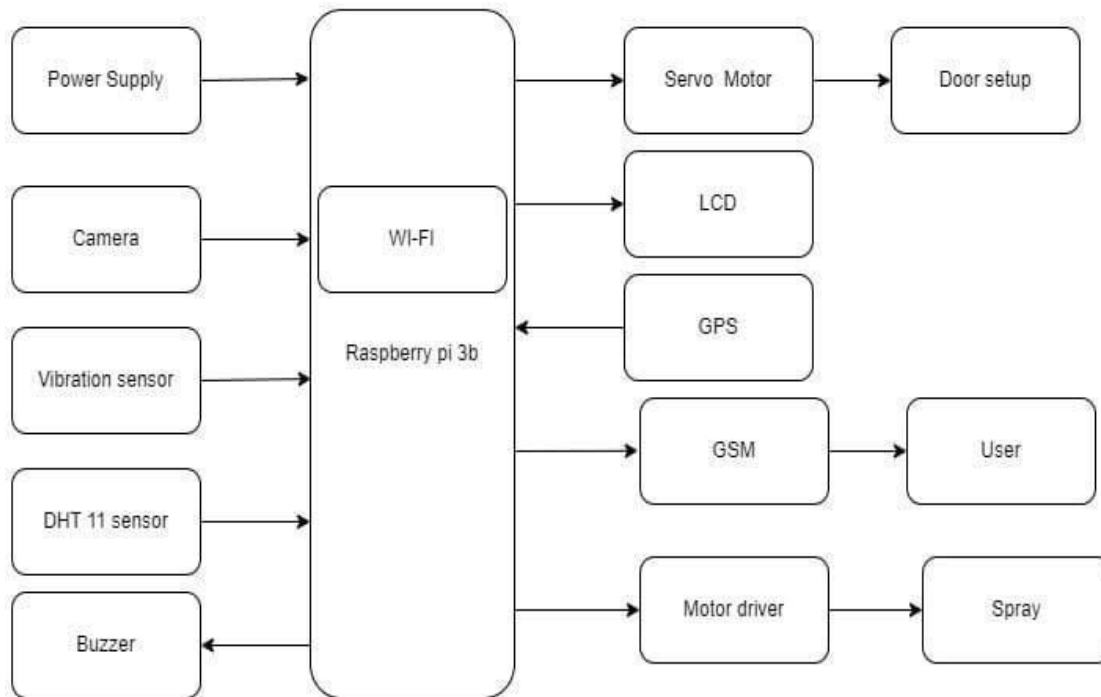


Fig.1 Block Diagram of Proposed System

In this project the Vibration sensor, Temperature sensor, Camera takes the input from the external environment and this collected information is given to the Raspberry pi 3B, here it can process that information and then according to that information output Devices can send the alert messages to the nearby police station and bank authorities through GSM Module and location will be sent with the help of the GPS Module and the Buzzer and LCD will alert the people in surroundings.

III. HARDWARE REQUIREMENTS

RASPBERRYPI3B:

Raspberry pi is a series of small single-board computers (SBC is a complete computer built on a single circuit board, with microprocessors, memory, input/output and other features required of a functional computer) developed by the Raspberry Pi foundation as shown in Figure 2.2. All models feature a broad com system on chip (SOC) with an integrated ARM compatible CPU and on-chip graphics processing unit (GPU). The foundation provides Raspbian (OS for Raspberry pi) based Linux distribution for download, as well as third-party windows 10 IOT core, RISC OS, and specialized media centre distributions.

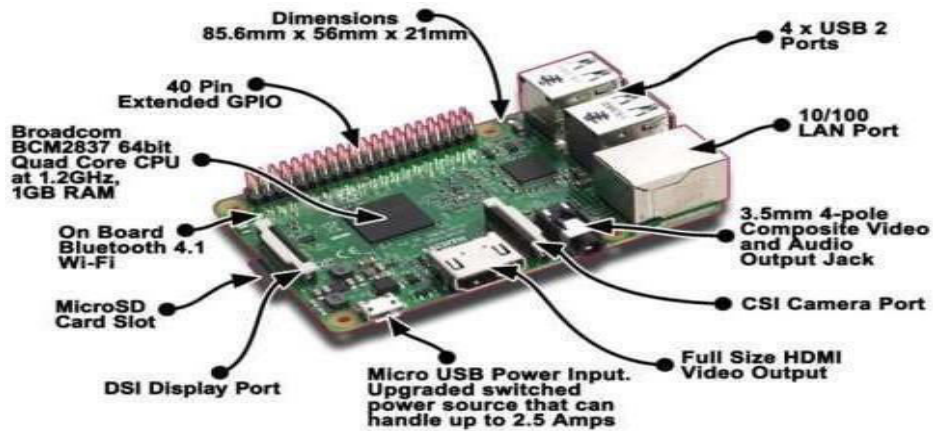


Fig.2 RaspberryPi3

VIBRATION SENSOR:

Vibration sensors are piezoelectric accelerometers that sense vibration from outside environment. It has a transducer which converts change in motion into electric current using piezoelectric effect. The sensitivity of vibration sensor is 100mV/g for 50g range applications. For the low vibration applications i.e., 10g, the sensitivity is 500mV/g. The vibration sensor is shown in fig.3.



Fig.3.Vibration Sensor

DHT11 SENSOR:

The DHT11 is used for Temperature and humidity measurement. It works based on NTC. NTC stands for Negative temperature coefficient. The sensor gives temperature and humidity as serial data. It is easy to interface with microcontroller. This sensor measures temperature range from 0°C to 50°C. The DHT11 sensor is shown in fig.4

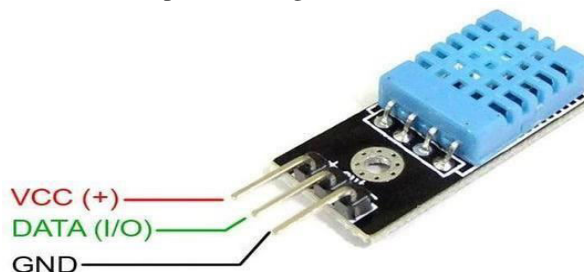


Fig.4. Temperature Sensor

GSM:

GSM stands for Global System for Mobile systems. It is four different frequency ranges. They are 900MHz or 1800 MHz bands. Some countries use the 850MHz and 1900MHz bands because the 900 and 1800MHz frequency bands were already allocated. The rarer 400 and 450 MHz frequency bands are used in some countries, where these frequencies were previously used for first-generation systems. The GSM is shown in fig.5.

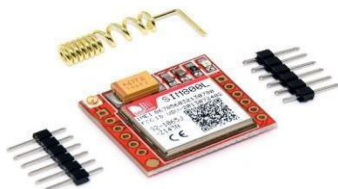


Fig.5. Global System for Mobile Communication

GPS:

GPS stands for Global Positioning for System. It works based on Satellite communication. GPS is nowadays mostly used and also has become an integral part of smart phones. The system is freely accessible to everyone with GPS receiver and unobstructed line of sight to at least four of GPS satellites. It operates between the range from 3.2 to 5V supply range thus enabling interfacing with microcontrollers with 3.3V as well as 5V. The GPS is shown in fig.6.

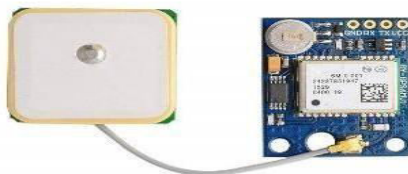


Fig.6. Global Positioning System

Servo Motor:

A Servo Motor is a type of motor that can rotate with great precision and accuracy. Normally this type of motor consists of a control circuit that provides feedback to the motor shaft, this feedback allows the servomotors to rotate with great precision. It is just made up of a simple motor which runs based on Servo mechanism. The servo motor is shown in fig.7.

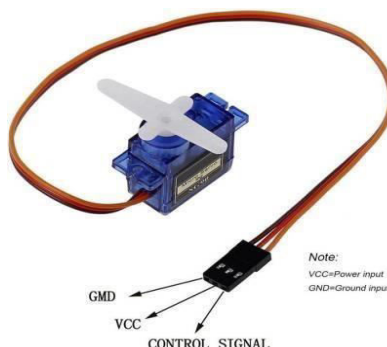


Fig.7. Servo Motor

FLOWCHART:

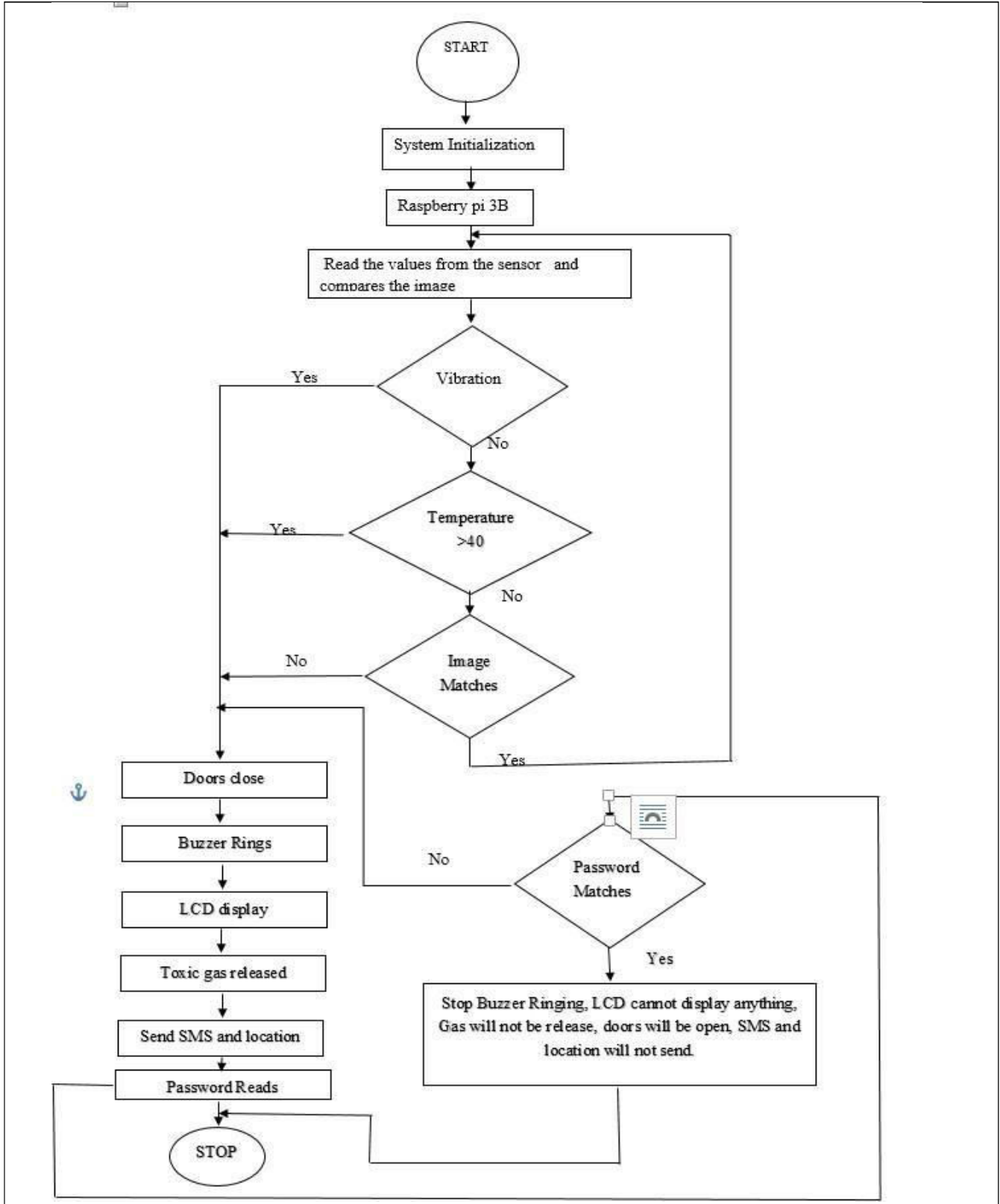


Fig.8.Flow Chart

IV. RESULT&CONCLUSION

This project presents high level of security to the ATM centers. The output shows that higher sensitivity and accuracy is indeed achieved using this project. We made this the project more user friendly, echo friendly and reliable. The proposed method is verified to be highly beneficial for the common people. This application very useful to cops and bank authorities to catch the thief easily. We have presented the module approach to minimize the ATM robberies. We have successfully implemented this project using RASPBERRY PI 3B. In all cases, our technology successfully detected the unauthorized activity in the ATM centers. The goal so the module will be fulfilled with the increase in the technology.

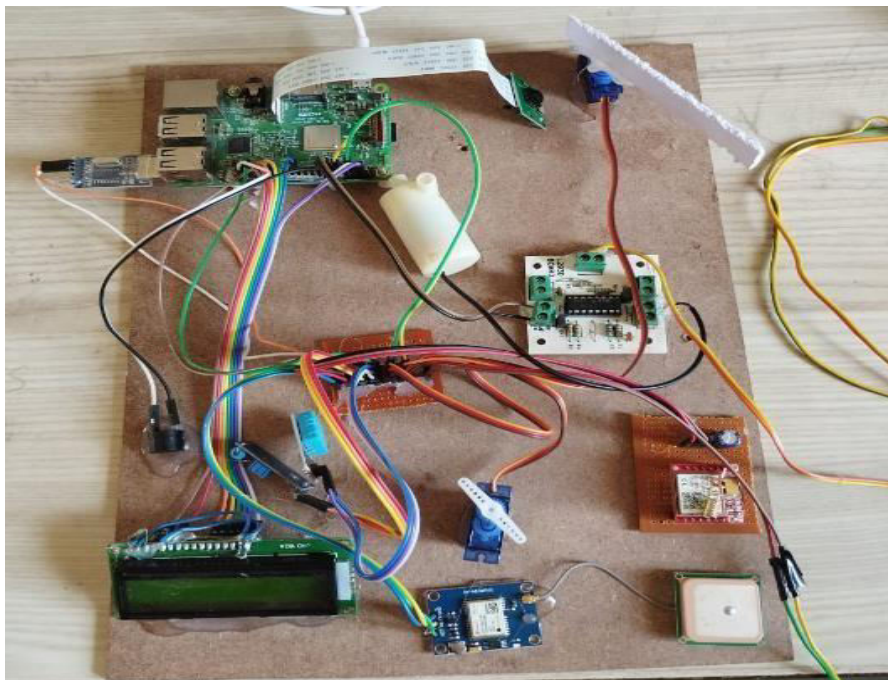


Fig.9.(a) Smart Anti-Theft ATM security system

If any vibration or temperature is sensed by vibration and temperature sensors, automatically doors will be closed, buzzer sounds alarm, LCD will display alert message to the outside people, the toxic gas will be released inside the ATM centers to make thief to unconscious state, message and location will be sent to nearby police station and corresponding bank authorities.



Fig:9(b)Authorized person

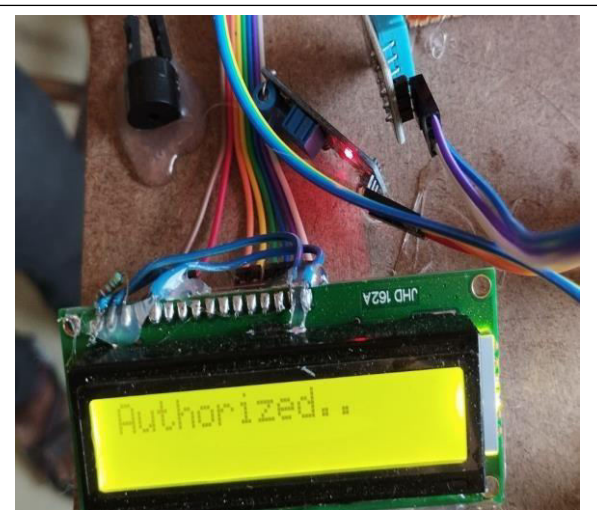


Fig:9(c)The LCD displays Authorized

The above figure shows that if the captured image and the image stored in the database will be matches then the money chest will be opened and LCD will display Authorized.



Fig:9(d)Unauthorized person

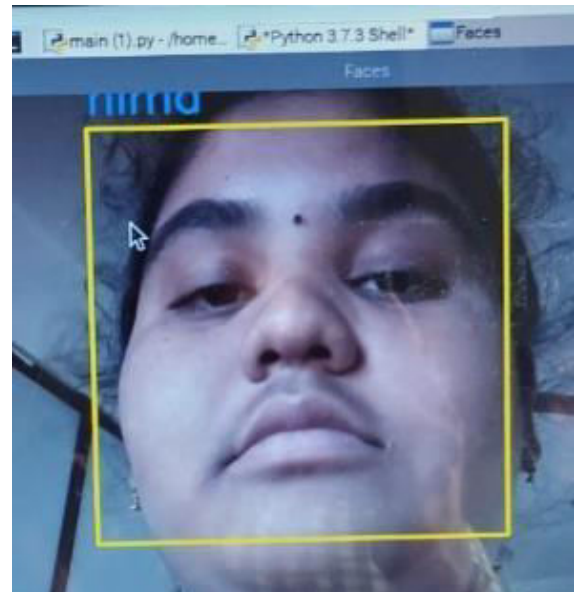


Fig:9(e)TheLCD display Robbery Occurred

The above figure shows that if the capture image and that image stored in the data base will no tmatches then LCD will be display the robbery occurred. Then the ATM center door gets closed and the toxic gas will be released. After that the buzzer rings and the LCD display will displays the alert message to the out side persons.The SMS and location are send to the nearby police station and the corresponding bank. After alert message will received by the cops and bank authorities,the doors of ATM center will be operated by using an App.

Whenever any abnormal condition gets detected in the ATM center, the vibration sensor gets vibrates & alert message send to then ear by police station& respected bank.

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