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Smart Security System Using Raspberry Pi

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ABSTRACT: Smart security eases and secures the management of the appliances and gadgets. This project main aim is a low cost and reliable smart security system that assists the users to manage appliances without the need of their physical presence and to protect our offices, companies from disasters,thefts. The proposed system includes smart door lock system. In addition to this if any unauthorized person tries to enter the company without access, send alert Message,and if the authorized person can access the door through IoT platform.In case of companies,it can be used as a attendance system along with in/out log register.it can store and display information of temperature & humidity of surrounding and controls the appliances/gadgets according to the data available, and notifies the users of switching on/off time of light, fan and other appliances using IoT platform. The system includes gas leakage & fire alarm. It has leakage gas removing&fire extinguishing facility and notification system using IoT platform,it can be very useful when dealing with dangerous gasses. Notifies the users of switching on/off time of light, fan and other home appliances using embedded web server an IoT platform. The user can also control the light and fan based on LDR andtemperature sensor values respectively. This system is user friendly and energy efficient.

KEYWORDS: IoT, Raspberry pi,EM-18 reader, gas sensor, DHT11 sensor, flame sensor, LDR, Fan & Light.

I. INTRODUCTION

In our society, more number of Robberies are occurring due to lack of security. Our idea deals with the providing security to the organization/home by overcoming the drawbacks present in existing technology. Whenever a thief wants to steal the money/valuables things present in the organization by using any physical equipmentor access with wrong card, then EM-18 Reader detects unauthorized access and send message through GSM, the raspberry pi does not sends signals to the servo motor,then doors are in closed manner.

If an authorized person access through RFID card, then automatically doors should be open and allow the person to the organization.IR sensor detects the movement of person & close the door after the person entered into the organization, if the temperature is greater than 27 degrees centigrade detected by DHT11 sensor automatically ON the fan through DC motor& the place is dark LDR should turn ON the lights. In case fire or gas is detected, then our system sends alert message to the registered number through GSM. And control the appliances like fans & light through program,and also see results in thingspeak like Temperature, Humidity.

II.METHODOLOGY

This system is used to monitor & control the appliances in the organization. If any unauthorized activity occur can be identified by the sensors, then an alert message is sent through GSM. So, we can easilycatch the unauthorized person. Here the Block Diagram and circuit diagram of Smart Security & control SystemUsing RaspberryPiasshowninFig.1. and Fig.2

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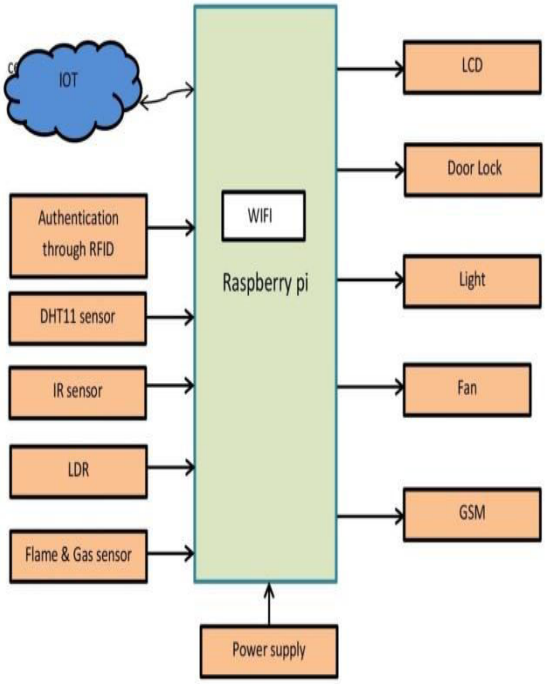

Fig.1 Block Diagram of Proposed System

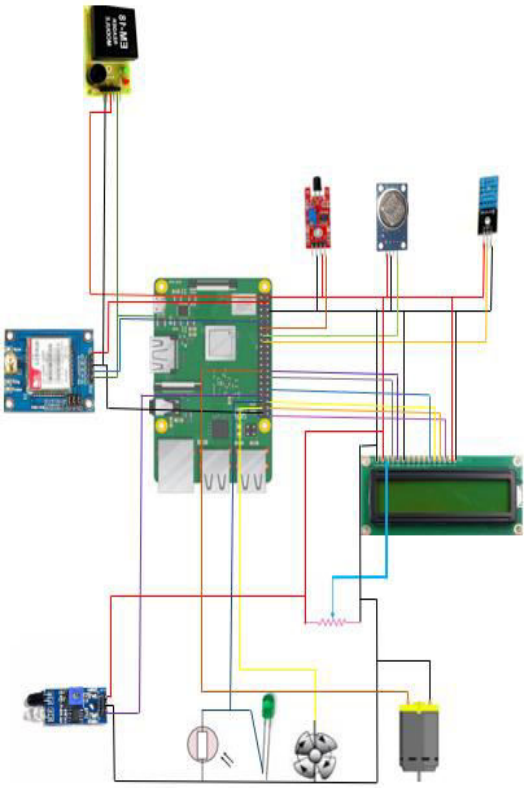

Fig.2 Schematic Diagram of Proposed System

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In this project the EM-18 reader, flame sensor, DHT11 sensor, gas sensor, LDR, & IR sensor 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 work like fans/lights ON/OFF, sends the alert messages to the registered contacts through GSM Module and LCD will alert the people in surroundings.

The work flow of proposed system will be in flowchart as in fig.3.

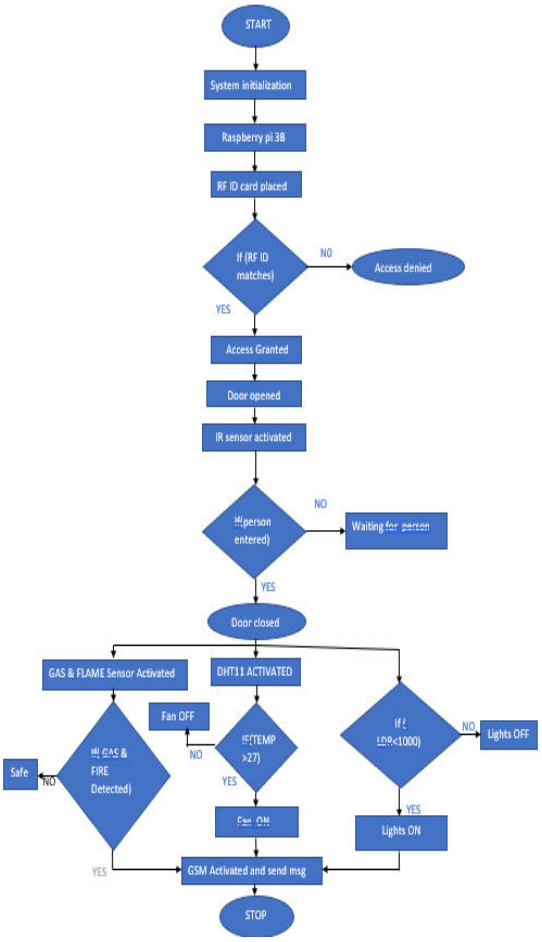

Fig.3 Flow Chart of Proposed System

III. HARDWARE REQUIREMENTS

RASPBERRY PI 3B:

As seen in Figure 4, Raspberry Pi is a line of miniature single-board computers (SBCs) created by the Raspberry Pi foundation. An SBC is a complete computer built on a single circuit board, with microprocessors, memory, input/output, and other characteristics necessary for a functional computer. A wide com system on chip (SOC) with an integrated ARM-compatible CPU and on-chip graphics processing unit is present in all variants (GPU). The foundation offers third-party Windows 10 IOT core, RISC OS, and specialised media centre distributions for download, in addition to the Raspbian (OS for Raspberry pi) based Linux distribution.

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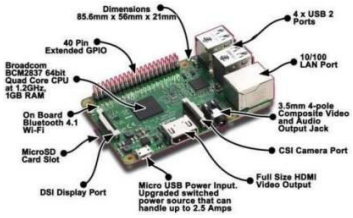

Fig.4 Raspberry Pi 3B+

EM-18 READER:

RFID is an acronym for "Radio-Frequency Identification" and refers to a technology whereby digital data encoded in RFID tags or smart labels (defined below) are captured by a reader via radio waves. RFID is similar to barcoding in that data from a tag or label are captured by a device that stores the data in a database. TheEM-18 readerisshowninfig.5. Radio frequency Identification i.e. RFID is a wireless identification technology that uses radio waves to identify the presence of RFID tags.Just like Bar code reader, RFID technology is used for identification of people, object etc. presence.

Fig.5 EM-18 reader

IR SENSOR:

It detects the movement in the home. Based on a simple basic Idea, this IR obstacle sensor, is easy to build, easy to calibrate and still, it provides a detection range of 10- 30 cm. This sensor can be used for most indoor applications where no important ambient light is present and it is shown in Fig.6.

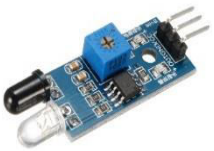

Fig.6 IR Sensor

LDR:

This resistor works on the principle of photo conductivity. It is nothing but, when the light falls on its surface, then the material conductivity reduces and also the electrons in the valence band of the device are excited to the conduction band and it is shown in Fig.7.

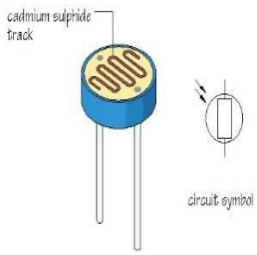

Fig.7 LDR

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DHT11 SENSOR:

Temperature and humidity are measured using the DHT11. It operates via NTC. Negative temperature coefficient is referred to as NTC. Temperature and humidity are provided by the sensor as serial data. Interfacing with a microcontroller is simple. This sensor measures temperatures between 0 and 50 degrees Celsius. The DHT11 sensoris depicted in Fig. 8 as such.

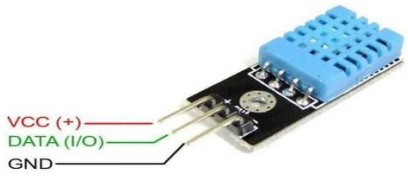

Fig.8 Temperature Sensor

GSM:

Global System for Mobile Communications, or GSM. Cellular network, that is. GSM networks function across four distinct frequency bands. The bands are either 900 MHz or 1800MHz. Because the 900 and 1800 MHz frequency channels were previously assigned, several nations use the 850 MHz and 1900 MHz frequencies.In some nations, where these frequencies were formerly used for first-generation systems, the more uncommon 400 and 450 MHz frequency bands are in use. In Fig.9, the GSM is depicted as

Fig.9 Global System for Mobile Communication

MQ135 GAS SENSOR:

The MQ135 is a sensor for air quality that can identify a variety of gases, including NH3, alcohol, smoke, carbon dioxide, and benzene.The MQ135 gas sensor is extremely sensitive to harmful gases such as ammonia, sulphide, smoke, and others. It is appropriate for air quality monitoring applications because to its inexpensive cost and Fig.10 displays it.

Fig.10 MQ135 Gas Sensor

FLAME SENSOR:

This sensorbasically an infrared radiation-sensitive sensoris used to find the presence of a fire source. The black LED installed on this module, which is a YG1006 NPN phototransistor, is included. In order to detect and respond to the incidence of a fire or flame, it has three pins: GND, VCC, and digital output pin. These sensors are also utilised in ignition systems to obtain precise actions or, in the absence of such, to alert the operator, as seen in Fig.11.

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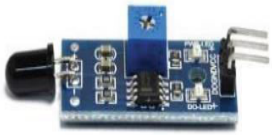

Fig.11 Flame Sensor

LCD DISPLAY:

The 4-bit mode and the 8-bit mode are the two operating modes for the LCD. In the 4 bit mode, we transfer the data one bit at a time, higher bit first, then lower bit. For those of you who don't know what a nibble is, it's a group of four bits made up of the lower four bits (D0-D3) of a byte and the top four bits (D4-D7) of a byte. We can convey data in 8 bits thanks to this. Certainly, 8-bit mode is faster and more reliable than 4-bit mode, as you surely have figured by now and is in Fig.12.

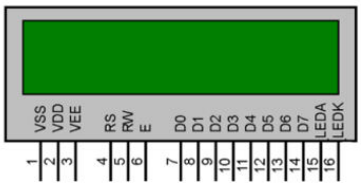

Fig.12 LCD

DC MOTOR:

A DC motor is any of a class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy. The most common types rely on the forces produced by induced magnetic fields due to flowing current in the coil. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor and it is shown in Fig.13.

Fig. 13 DC Motor

IV.RESULT & CONCLUSION

This project presents high level of security to the organizations. 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 security system using internet of things.This system gives the signal whenever the fire leakage or gas leakage takes place through Message.This system also stores the temperature and humidity of home. We can also control our home appliances from anywhere in the world without need of our presence by using IoT.This system also contains door lock system whenever the authorized person came automatically door will opens through RFID card,otherwise incorrect card is placed access denied & sends Message.

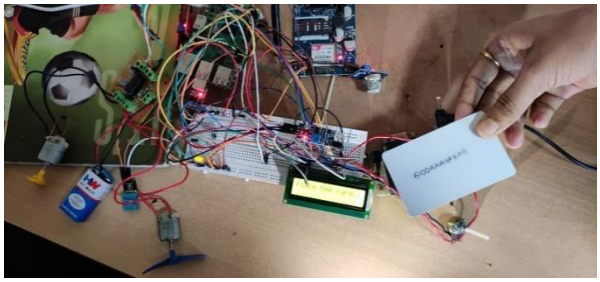

Fig.a: place the card on the scanner,if the card is detected by EM-18 module.Then access is granted,otherwisedenied.In this situation we can avoid unauthorized access.

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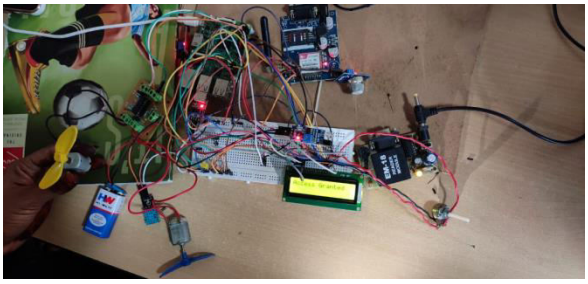

Fig.b:Access Granted,doors open & person enters the room & closes the door using IR sensor.DHT11,flame&gas sensors detects and dispalys a message on LCD.

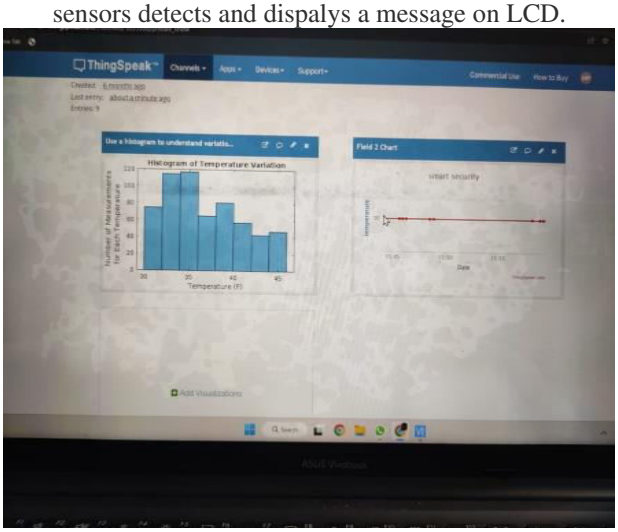

Fig.c:Thingspeak output

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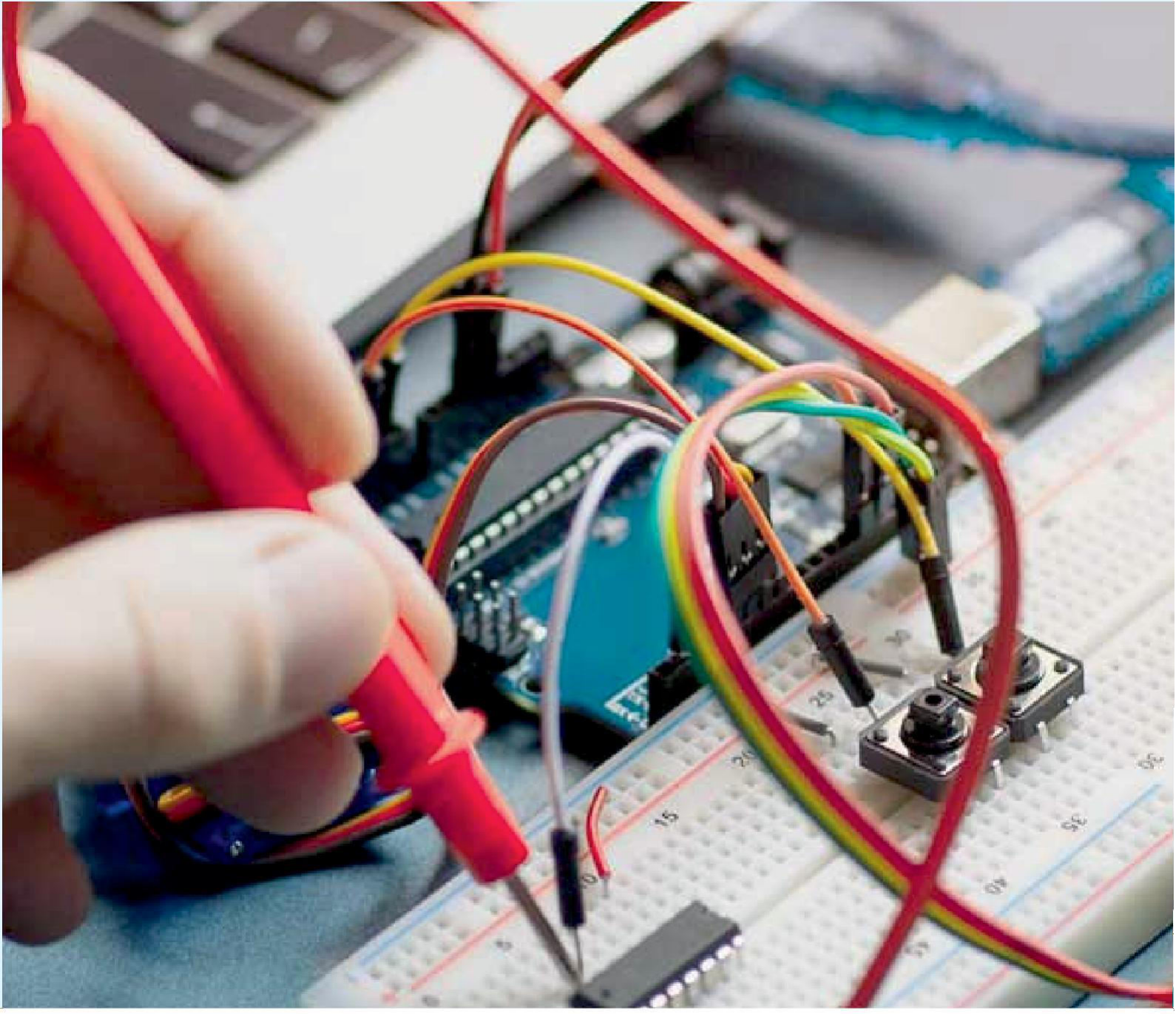

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