International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

REAL TIME FACE DETECTING UNAUTHORIZED HUMAN MOVEMENT USING ESP 32 CAM MODULE

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Abstract - In the present world, The IoT is at its peak. The globe is becoming smarter, and security and Door automation are emerging. This system uses visual surveillance and much useful in home and company security. The main processing unit here using is ESP 32 cam module. The most purpose of smart Door technology is to supply complete security to the Door, ease, and luxury for users. The project enlarges the Door automation and security technique using ESP 32 CAM module and android phone. ESP 32 CAM module (Inbuild-Wi-fi) controls the PIR sensor, camera module, electric mini lock which is employed in detecting the motion of arrival of someone, capturing a picture of an individual as soon as send the still image to the android device through Blynk (legacy) app and alerts the owner about the person standing at the door and also control the lock system with help of relay connect to ESP 32 CAM Module. The complete systems programming has been established in python 3.5 domains for ESP 32 CAM module operations.

Keywords: ESP 32 CAM Module, image capturing, PIR sensor, Blynk (legacy) app, python, Electric mini lock, Relay, transistor, voltage regulator.

1. INTRODUCTION

Today, security is becoming gradually wide spread a bit wise due to its several benefits, and with such advancement happening, the security of one's home must also not be left behind. This project presents a basic application of the ESP32 cam module in the fields of security, automation, and the Internet of Things. in which the control signal of the respective GPIO pin of the ESP 32 cam module is controlled by the content of the message received by the application client running on the ESP 32 cam module. The application used here is a cloud-based multi-platform messaging application called "Blynk".

Nowadays, robbery is on the rise. So, there is a great effort to build a safety system that will brilliantly manage this issue, keeping users away from terror about residential security in all cases. The system is measured to be best only if it offers a shield and monitoring that guards in contradiction of many threats, protecting the home in contradiction of the elements as well as break-ins and home attacks.

Whenever the user is asleep at night or away from his residence for some reason, there is a chance that he is left unconnected with people who visit his place. These visitors may be known or unknown to the user. The planned system consists of a PIR motion sensor, a camera, a relay, and an electric mini lock. The PIR sensor, which detects the presence of human appearance, will send a signal to the ESP 32 CAM Module, and an important operation of the camera will capture an image. The ESP 32 Cam Module will send the captured image to the user through the Blynk application and also control the security lock (electric mini lock) with the help of a relay connected to the ESP 32 CAM Module (Inbuild Wi-fi) and comment passes through in the Blynk application.

In every "thing" has its unique identity that's what IoT (Internet of Things). It enables the connectivity with physical devices and allows user to transfer the information across the globe through the networks. The technology is playing an important role in day-to-days life. The main objective of our project is to make a system that will control the door employing a smart phone. this method includes various components sort of ESP 32 CAM Module (Inbuilt-Wi-Fi), PIR Sensor, Camera Module, Relay, voltage regulator, electric mini lock and a Blynk(legacy) App for getting the notification on an Android Device.

2. WORKING PRINCIPLE

The security system uses the PIR motion sensor to detecting the motion of arrival of someone. If any human movements detected then ESP 32 CAM Module will send the signals to serial port and this will process to the camera capture the image. The captured image send to the ESP 32 cam module (Inbuild-wi-fi). when the ESP 32 cam module received image send to the Blynk

application and also control the electric mini lock system its connected to 5pin 12v relay and then relay connected to the ESP 32 cam module.

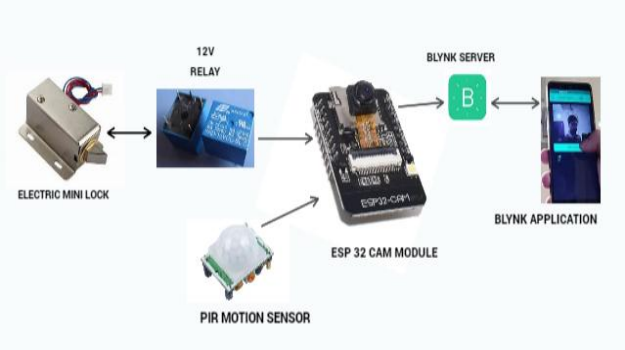

Fig-1 Schematic image of a security system model

Whenever the user is away from his residence for some reason, there is a chance that he is left unconnected with people who visit his place. These visitors may be known or unknown to the user. For any unauthorized, the owner has to send command as open for entering into the residence.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM

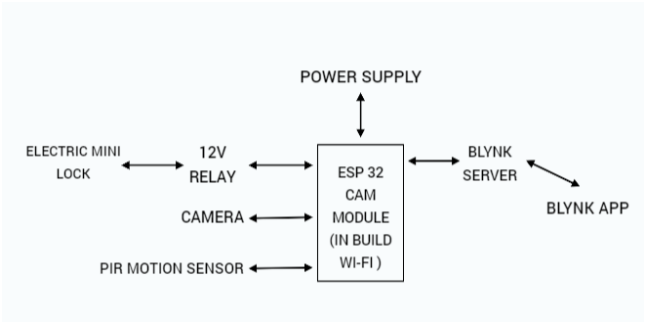

Fig-2 Block diagram of security system

4. ELEMENTS OF A SYSTEM

4.1 ESP 32 CAM MODULE

The ESP 32 CAM module may be a full-featured microcontroller that also has an integrated video camera and microSD card socket. It's inexpensive and simple to use, and is ideal for IoT devices requiring a camera with advanced functions like image tracking and recognition. The sample software distributed by Express if includes a sketch that permits you to create a web-based camera with a classy electrical device. After you get the hang of programming the device, you'll find that it's very easy to use. The ESP32-CAM module has fewer I/O pins than the previous ESP-32 module we checked out. Many of the GPIO pins are used internally for the camera and also the microSD card port. Another thing missing from the ESP32-CAM module could be a USB port. so as to program this device, you'll must make use of an FTDI adapter.

The "top" of the board has the connector for the camera module, furthermore because the microSD (sometimes called "TF") card socket. You'll also note a square white LED on the highest of the module, this will act as a "flash" for illuminating the topic you're trying to look at with the camera. The underside of the printed circuit has the ESP32-S module. It also contains a connector for an external antenna, in addition as an indoor antenna that's etched onto the card. I'll explain the way to use the external antenna shortly. Another key component located underneath the board is that the reset switch.

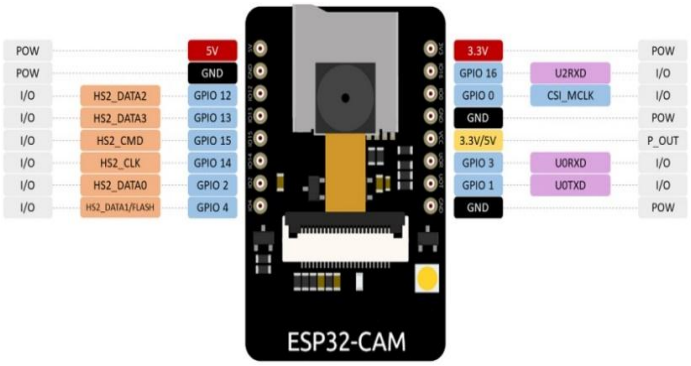

Fig-3 ESP 32 CAM Module

4.2 PIR MOTION SENSOR

PIR (Passive Infrared sensor) is an electronic component that measures any quite object (person / animal) within the field. The window behind the lens is formed from IR transmissive material. The lens condenses illumine to some 6-7 meters and its sensitive. it's a pin's consisting of VCC, Ground and therefore the Output. The output is given to GPIO pins of ESP 32 CAM MODULE through 5V of power supply to the VCC. It is necessary to detect any intruder as early as possible in order that user can take immediate action to shield their properties. The detection range of a normal low-cost PIR sensor based system is 10 m but this is often enough to hide most rooms with high ceilings. PIR sensor able to detect sense motion and it ready to detect whether a person's movement within the sensors range.

Fig-4 PIR motion sensor

4.2.1 READING PIR SENSOR:

Connecting PIR sensors to a microcontroller is actually simple. The PIR acts as a digital output so all you wish to try to is listen for the pin to flip high (detected) or low (not detected). it's likely that you're going to want retriggering, so take care to place the jumper within the H position! Power the PIR with 5V and connect ground to ground. Then connect the output to a digital pin i.e. the GPIO pin of the RPI device. A Python code can then be accustomed read a channel from the PIR sensor.

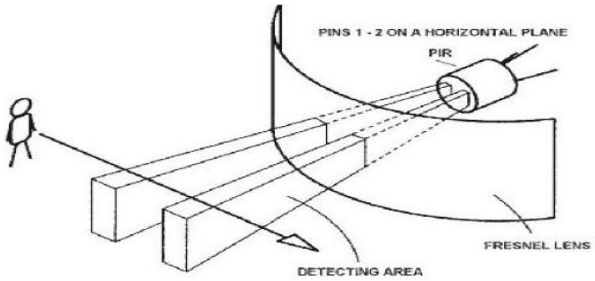

Fig-5 Operation of PIR sensor

4.3 RELAY

Relay is one quite electro-mechanical component that functions as a switch. The relay coil is energized by DC in order that contact switches are often opened or closed. one channel 5V relay module generally includes a coil, and two contacts like normally open (NO) and normally closed (NC). this text discusses an outline of the 5V relay module & its working but before visiting discuss what's relay module is, first we've got to grasp what's relay and its pin configuration.

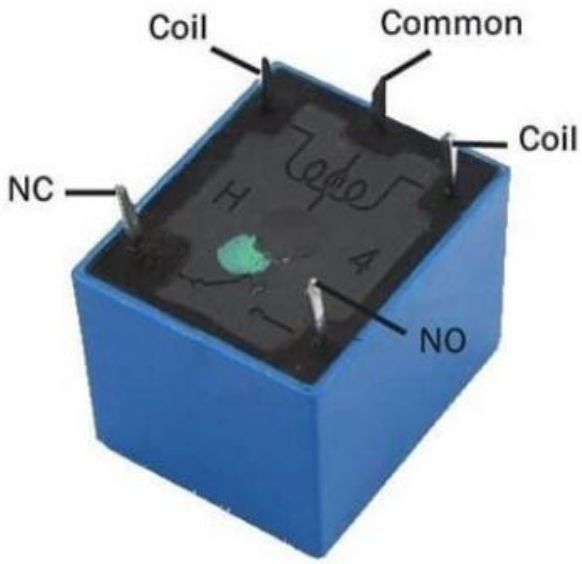

Fig-6 Relay pin diagram

Pin1 (coil): it's accustomed activate the relay; usually this pin one end is connected to 5Volts whereas another end is connected to the bottom.

Pin2 (coil): This pin is employed to activate the Relay.

Normally Open (NO): This pin is often open unless we offer a sign to the relay modules signal pin. So, the common contact pin smashes its link through the NC pin to create a connection through the NO pin

Common Contact: This pin is employed to attach through the load that we desire to modify by using the module.

Normally Closed (NC): This NC pin is connected through the COM pin to create a circuit. However, this NC connection will break once the relay is switched through providing a vigorous high/low signal toward the signal pin from a microcontroller.

5. HARDWARE DESCRIPTION

5.1 MOTION SENSOR

The primary module within the proposed system is human motion detector. it's accustomed sense the human movements through the hardware available within the system. this will be installed at entry and exit points like doors, windows, etc. This work is completed by PIR sensor. This may contain different components like resistors, capacitors, IC's, etc .and therefore the

connected to the ESP 32 CAM module and receive the signal into PIR sensor.

5.2 IMAGE CAPTURING

The function of the system to receive the signal from PIR sensor and then image will be captured by camera on inbuild with ESP 32 CAM module. The image captured after send to the Blynk app and also continuous to captured the still images with the comment passes through the ESP 32 CAM module connect to Blynk server and Blynk server connected to the Blynk application. The Blynk application used to received captured image and also passes the comment.

5.3 ESP 32 CAM MODULE SENDING STILL IMAGE TO BLYNK APPLICATION

The main processes of a system sending still image of captured images to the ESP 32 cam module. ESP 32 cam module is processor and also inbuild wi-fi and camera. the ESP 32 cam module after captured the image is send to the Blynk application. And notification send to the user and These visitors may be known or unknown to the user. For any unauthorized, the owner has to send command as open for entering into the residence.

5.4 RELAY AND LOCK

When the purpose of using the relay its control the electric mini lock. relay connected to the ESP 32 CAM Module processor and then processor connected to the sever and server connected to the Blynk application. When using the Blynk application to send the comments passes through into the processor. Processor send a signal to relay. Relay send a signal to electric mini lock.

6. SOFTWARE DESCRIPTION

6.1 BLYNK APPLICATION

The security features of data encryption and the ability to create the Blynk bots with several functions via programming code using the Blynk application. The Blynk application processes comments and receives the output of the process and controls the processor with the comment passed through to the processor. when connecting to the Blynk server and uploading code to the processor. The server is connected to the Blynk application.

6.2 SOFTWARE AND IMPLEMENTATION

The software used for this method used for capturing images is.net files. The programme code for the proposed system uses the Python language. Implementation is the stage of the project when the theoretical design becomes a working system. This is often the ultimate and most important innovation in the system life cycle.

Each module in our system will work with flexibility and accuracy. The programmes that were written must be well synchronised in order for the hardware part to work properly. The complete implementation of the system starts from the detection of human movements, and the result is going to be the image sent to the Blynk application.

1.Initially the hardware part after getting power supply, it will Switches the PIR sensor to detect any intrusion. After detection it'll send signal to the processor to perform further operation.

2. The program run continuously and waits for the signal from the processor. When the signal is received from the processor the system captures the image.

3. The captured image send to the server and server send to the Blynk application.

4. It'll be Send to the Blynk application with the captured image.

5. When the user Send the command as open then only the door otherwise it'll not open.

7. OBSERVATION

8. CONCLUSION

We have a designed a smart system which reduces the human efforts and provide the ease to operate the Smart door, can access it from any corner of the world, providing a good security. It is easy to upgrade, portable. The smart door lock system using

Blynk app is very efficient technique, which allows the user to grant the access to the known person by sending a back message to RPI and unlock the door. The system uses various components like PIR sensor, camera module, switch and Blynk app on an android phone. The coding is done using python language and installation of a Blynk is done using CLI Blynk app

9. REFERENCE

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