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HOME SECURITY AND AUTOMATION USING IOT

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Abstract:- **Security and automation in the house is an essential part of human life.To safeguard the house from a thief, home security is required. We'll require home automation to verify the status of the electronic equipment while you're gone. we need internet in home automation to operate or monitor anything within the house from the outside. We operated to integrate the Internet of Things (IoT) in our home security system because of the widespread adoption of the technology. We require IoT-based home security. We choose the latest edition of the Raspberry Pi model, the Raspberry Pi 3 Model, as a platform to connect items and run software.**

Keywords**: open CV: Face recognition: TELGREM Platform: VIOLA JONES Algorithm, Raspberry Pi3 model**

I. INTRODUCTION

The most crucial aspect of human life is the home security system. We can now witness an increase in the number of robbery cases and their impact on human life. It is critical to safeguard our home against theft. We can capture our image with the cctv camera however the image is not correct for the sake of safety the crucial aspect is capturing purpose images. By using he cctv camera we can capture the image but we cannot give the permission. The importance of home security cannot be overstated. It is critical to secure one's home from a thief. Home automation is an integral aspect of everyday life. To control our equipment remotely from our phone. To control our equipment remotely from our phone we discussed how to solve the problem of home security and how to operate our electronic equipment in this paper.

II. LITERATURE SURVEY

Ms. Ashwini Pawar [1] have presented a paper title "Internet of Things Based Home SecurityUsingRaspberryPi" This paper suggests utilising the Raspberry Pi and the pir sensor to detect thieves.

SK. Shahina Begum1 [2] "Home Automation and Security System with NodeMCU using Internet of Things." In order to operate the electronic gadget utilising the blink application, a system upgrade was suggested in the study.

Thirrunavukkarasu R R [3] "Customization in Home Automation Using IoT"For home automation, ubidots is utilised as the user interface. We must first log into the ubidots interface. Then we'll want to choose a mode, such as movie mode, party mode, or sleep mode. Only the fan will turn on in sleep mode, and the bedroom light will be switched off.

Sourabh Sarkar [4], "Android based Home Security Systems usingInternet of Things (IoT) and Firebase"The system provides information on the Firebase application and how the node mcu interacts with it.For Bulgar alert, the pir sensor is employed.

III. SYSTEM OVERVIEW

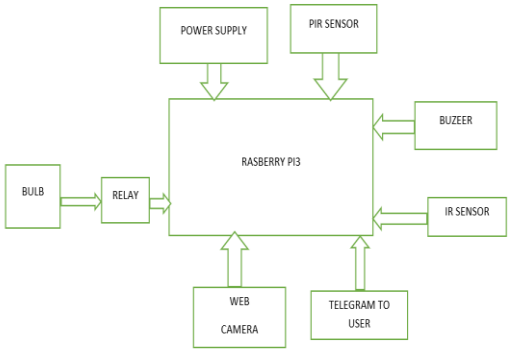

Fig. 1Block diagram of Home Security and Automation using IOT

The concept of home security and automation is discussed in this project. Telegram is a popular social media programme nowadays. Using this application, we can demonstrate how we meet both home security and automation criteria. So, initially, we'll go over the project's home security aspects. We must first save the image of the family member in the database. If another person, such as a robber or a friend, comes into contact with this family member, you and your family member will be separated. The person's image can then be recorded and sent to your telegram application, and buzzer will turn on. The principal user can then initiate the authentication process. if there is any electrical item such as a fan or a tube light.

A. Open cv

The open-source library open cv can be used in fields such as image processing and artificial intelligence. It may be used to recognise several forms of visual patterns. It can also be used to store many types of images. The open cv platform can be used to detect faces in real time.

B. Web camera

A web cam is a small camera which can be used to record images. We used this web camera to stream the video over the internet. It has the ability to record video. Huge volumes of data make up digital video streams, making transmission (from the image sensor, where the data is constantly created) and storage difficult. Huge amounts of data help compensate digital video streams, making transmission (from the image sensor, where the data is constantly created) and storage difficult. The image from the sensor is read and transmitted to the host computer by the support electronics. The camera on the right, for example, transmits its image over USB using a Sonix SN9C101. Each frame is often transmitted in RGB or YUV unprocessed or encoded as JPEG. Some cameras, such as cell phone cameras, employ a CMOS sensor with supporting electronics "on die," which means the sensor and supporting electronics are constructed on a single silicon chip to save space and manufacturing costs. To make video calling and videoconferencing more convenient, most cameras come with built-in microphones

Fig. 2 Example of an image with acceptable resolution

1. PIR SENSOR

The abbreviation PIR stands for passive infrared sensor. Motion sensor is another name for PIR sensor. The passive infrared sensor does not emit any energy into the environment. To sound an alarm, it receives infrared radiation from the human body. Anything that has a temperature emits infrared photons to the outside world. The human body's surface temperature ranges from 36 to 27 degrees Celsius, with the majority of its radiant energy focused in the wavelength range of 8 to 12 microns. Infrared detectors (infrared probes) and alarm control sections are two types of passive infrared alarms. A piezoelectric detector is the most common infrared detector. It is used as a sensor to convert infrared radiation from humans into electricity. It is possible to directly irradiate the detector with human infrared radiation.

PIN	PIN FUNCTION
5V	Input pin
D0	Analog Output
GND	Ground

Table 1. PIR Sensor Pin Connections

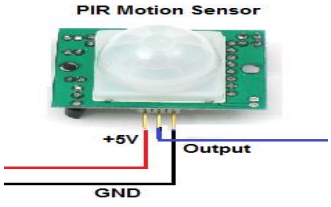

Fig .3 PIR Sensor

2. Buzzer

A buzzer is a device that converts audio signals into sound signals. DC voltage is frequently used to power it. As a sound device, it's found in alarm clocks, laptops, printers, and other electrical equipment. A buzzer is a voice device that transforms an audio model into a sound signal. It is mostly used to alert or prompt. It may generate music, flute sound, buzzer, alarm sound, electric bell, and other sounds according on the design and application. Electric bell and other sounds according on the design and application. The buzzer's pin configuration is depicted in the diagram below. It has two pins, one positive and the other negative. The '+' symbol or a longer terminal represents the positive terminal of this. The positive terminal is powered by 6 Volts, whereas the negative terminal is represented by the.

Fig .4 BUZZER

3. .Raspberry Pi 3 Model B

Fig .5. Raspberry Pi 3 Model B

The Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model. The Raspberry Pi 3 has 1 GB of RAM in the B and B+ models.The power supply current capability for the Raspberry Pi 3 B+ model is 2.5mA.

Feature:

1. It contains 1GB of LPDDR2 memory.
2. GPIO - 40Pin
3. The power supply current capability for the Raspberry Pi 3 B+ model is 2.5mA.
4. Processor: Broadcom BCM2837 Processor Quad core A53 (ARM v8) 64-bit SoC
5. Bluetooth: Cypress BLE chip 2.4Ghz/5.0GHz IEEE 802.11ac
   Ethernet: Gigabit Ethernet over USB 2.0 (300Mbps max)
   USB: Four USB 2.0 ports
6. HDMI: 1 x full size
7. Storage: microSD card slot for loading operating system and data storage
   Power: USB connector for 5.1V / 2.5A dc

4. Viola Jones algorithm

Paul Viola and Michael Jones developed the viola jones algorithm concept in 2001.To construct a fast and accurate system for object recognition, the viola jones algorithm relies on concepts such as Haar-like Features, Integral Images, the AdaBoost Algorithm, and the Cascade Classifier. "A Boosted Cascade of Simple Features for Rapid Object Detection." Despite being an obsolete framework, Viola-Jones is highly effective, and its application in real-time face recognition has proven to be particularly noteworthy. This algorithm takes a long time to learn yet can detect faces in real time at a high rate. A Haar-like characteristic is made up of dark and light areas. The sum of the intensities of the light regions is subtracted from the sum of the intensities of the dark regions, yielding a single value.

The various Haar-like features allow us to extract important information from an image, such as edges, straight lines, and diagonal lines, which we can use to identify an object (i.e.the human face). Haar like Feature values were derived from the difference in the number of dark area pixel values for a particular image, such as this one, by multiplying them by the brightness of the different areas of the image

$F(Haar) = \sum F\ white - \sum F\ black$

The INTERGRAL IMAGE is used to allow the calculation of sum of all pixels inside any given rectangle using only four values of corner of the rectangle. Adaboost is the machine learning algorithm which helps in finding only best feature all these 160,00+ features. A cascading stage is used to determine whether a given Sub window is definitely not a face or may be a face. A Haar-like characteristic is made up of

dark and light areas. The sum of the intensities of the light regions is subtracted from the sum of the intensities of the dark regions, yielding a single value.

The various Haar-like features allow us to extract important information from an image, such as edges, straight lines, and diagonal lines, which we can use to identify an object (i.e. the human face).Viola-Jones draws a box (as shown on the right) and searches within it for a face. It's basically looking for haar-like characteristics, which will be detailed later. After cycling through all of the tiles in the photo, the box moves a step to the right. For demonstration purposes, I've used a huge box and large steps, but you can adjust the box size and step size to suit your needs.

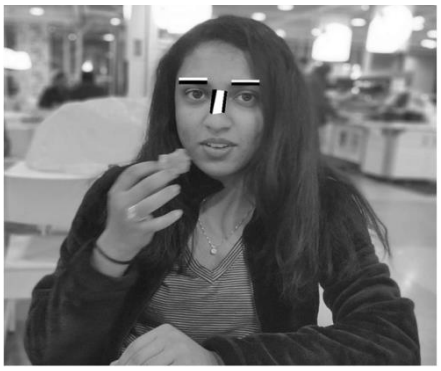

Fig .6. Viola Jones algorithm

5. IR Sensor

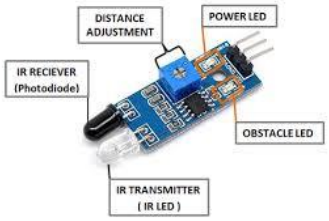

Fig .7. IR Sensor

An IR sensor can monitor an object's heat while also spotting movement. All things emit some kind of thermal radiation in the infrared range. Although these kinds of radiations are invisible to the human eye, infrared sensors can pick them up. The detector is merely an IR photodiode, while the emitter is merely an IR LED (Light Emitting Diode). The same wavelength of infrared light that an IR LED emits may be detected by a photodiode. The resistances and output voltages when IR light strikes the photodiode will vary proportionally to the intensity of the IR light received. An infrared source, a transmission medium, an optical component, infrared detectors or receivers, and signal processing are the five fundamental components of a conventional infrared detection system. Infrared sources include infrared lasers and LEDs of a certain wavelength. The two components of an IR sensor, an IR LED and an IR Photodiode, collectively known as a Photo Coupler or Opto-Coupler, are used. An infrared transmitter, often known as an IR LED, is a light-emitting diode (LED) that emits infrared radiation. Although an IR LED appears to be a regular LED, the radiation it emits cannot be seen by the human eye. Infrared radiation from an IR transmitter is picked up by infrared receivers or infrared sensors. Photodiodes and phototransistors are used as IR receivers. As opposed to regular photo diodes, infrared photodiodes only pick up on infrared radiation.

6. Flowchart

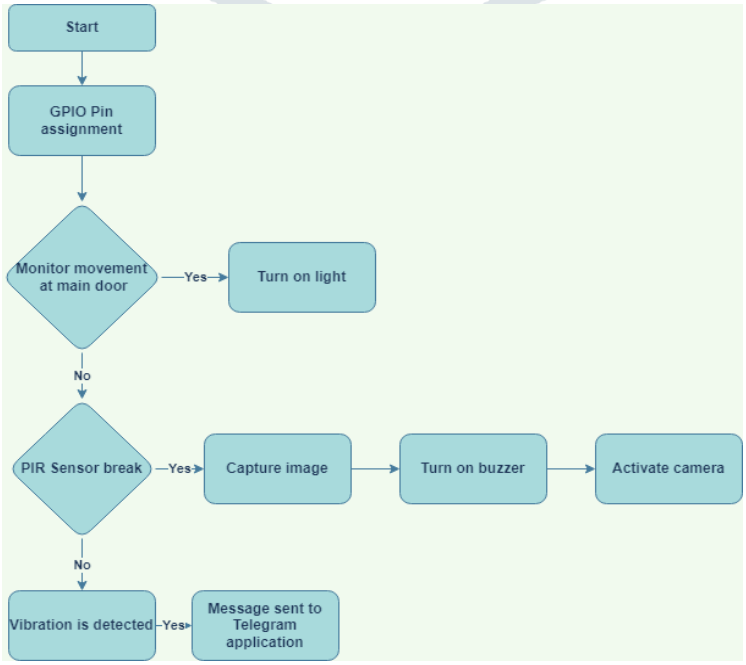

Fig .8. Flowchart of home security

The fig .8. Shows The Raspberry Pi 3 B+ variant can assign the GPIO pin. The main door's camera is situated there. The PIR Sensor is able to record human movement. a camera may be used to capture the image. The store image can be compared to another image, and if they match, the true result is displayed. If the image cannot be found in the database, it is sent to the Telegram application.

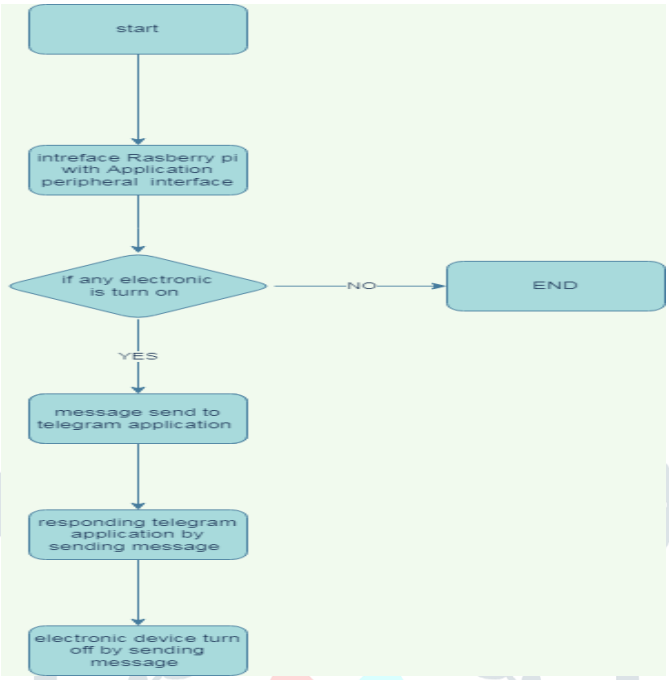

Fig .8. 1 Flowchart of home automation

The fig .8.1 Shows Raspberry Pi must first be connected to the application peripheral interface. It is capable of continuously displaying an electronic device's status. Any gadget that has the ability to stay powered on can send a message to the Telegram app. The device is turned off by sending a message to the telegram application instructing it to do so.

IV. RESULT AND CONCLUSION

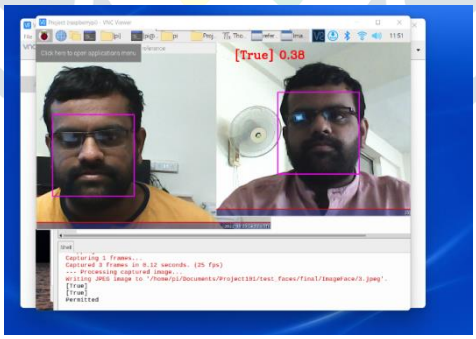

Fig .9. True image

Figure 9. Displays the actual outcome. First, the image is stored in a database. If the image can be matched with the image that is stored in the database. Then it can display the actual outcome.

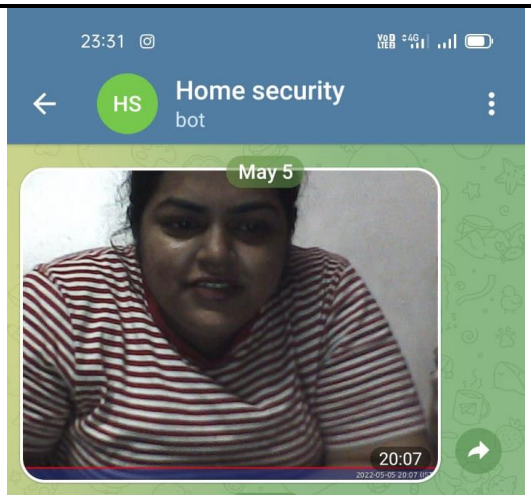

Fig .10. False image

Figure 10.shows the actual result. The photograph is initially kept in a database. Whether the image and the image in the database can be matched. The actual result can then be displayed. The image is sent to the Telegram programmed if it does not match any images stored in the database.

Fig .11. Remotes acess through telegram

Figure 11. Shows the results of the home automation.Any electronic equipment that is currently turned on can be made to turn off simply sending a message to the Telegram app.

V. CONCLUSIONS

We used the Raspberry Pi 3B to implement home security and automation. The image of a family member can be saved in the database. TO Use the Web Camera to Capture the and send the image to the Telegram Application. It is possible to do so in terms of security criteria. to examine the status of the gadget If any devices remain turned on, use the telegram application to switch them off.
We used the system bank system and college to improve the project.

VI. ACKNOWLEDGMENT

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