IOT Based Approach For Monitoring And Activity Recognition In Smart Home

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Abstract: The recommended system presents a novel communication protocol for monitoring and managing the home environment that encompasses more than just switching operations and differs from previous systems in that it does not call for a dedicated server computer. This project offers clever fan and lighting control. Here, the system is connected to both light and temperature control.

Keywords: PIR, sensor, camera, microcontroller, GSM modem, Wi-Fi, an Arduino, a home automation system, an Android phone.

I. INTRODUCTION

Arduino's Wi-Fi connectivity is implemented using serial peripheral interface (SPI) pins. Security systems are crucial since crime and break-ins are on the rise. A security system that continuously scans the region and quickly responds to threats is required. For both indoor and outdoor applications, the market is flooded with security systems, including those that use infrared, photoelectric, and ultrasonic detectors. The system block diagram is shown in Fig. 1. The PIR sensor uses the infrared radiation given off by a human body to detect the presence of a person. PIR receives incoming infrared radiation passively rather than emitting an infrared beam. The microcontroller reads the output from the PIR sensor. The microcontroller determines a call based on the pulse it receives.
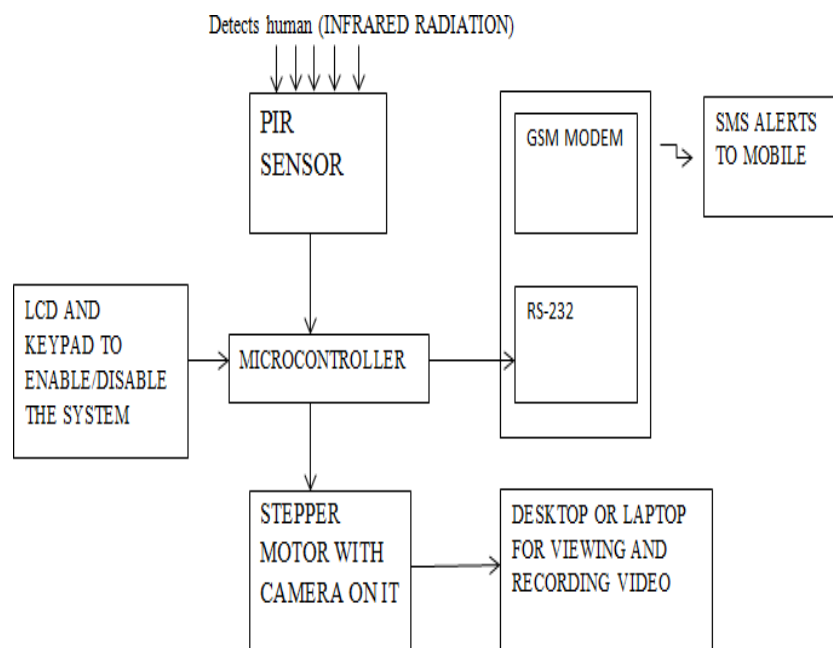

Figure 1: Block Diagram of a System

The system may be enabled and disabled using an LCD and keyboard. Because the camera being utilised is so compact and portable, the technology is known as Invisible Eye. The PIR sensors are also. By doing this, the intrusive party will be ignorant of the system's existence. This essay is divided into a total of eight sections, including this one. The detecting

technique and PIR sensors are covered in Part III, while other related studies are discussed in Section II. The circuit schematic and operating information are presented in Sections IV and V, respectively. A flowchart for the application is included in the section. In Section VII, the experimental results of the active prototype system are discussed. Finally, upcoming developments

II.   LITERATURE SURVEY

A.   Invisible Eye in Advanced Security System:

In this paper, having an abstract that multiple Management can only examine the film that was informed on the existence of an intruder using a camera-based security system that may be used to protect valuables housed in a room of a home or property. We have developed a prototype that where this multiple camera usage has been replaced by a single camera and This information about the intruder will be sent to the after the intruder has been discovered.

B.   Smart Home Monitoring:

The suggested method is assessed using various facial expression datasets and contrasted with other cutting-edge models. In this paper, they have presented that used call fee is a significant drawback of using DTMF (dual tone multi-frequency) for home automation and also by web server in which web server design is complex and require more memory space. We utilize Raspberry Pi-based home automation because it is superior to conventional home automation techniques in a number of respects and also the system is improvised by IOT.

C.   Speech To Text (STT) or Automatic Speech Recognition (ASR):

Users may now conduct transactions utilizing interactive voice response systems without having to navigate a large touchtone menu, and the technology also enables businesses to do away with the expense of hiring customer care representatives. In addition to helping students with their pronunciation, voice recognition plays a significant role in education. Speech-to-text software enables students to compose notes and other documents by speaking instead of typing most of the time.

D.   Facial Recognition System Using Deep CNN:

The main objective of this study is to create a Deep Convolutional Neural Network (DCNN) model that can classify five different types of emotional expressions on a person's face. The model is trained, tested, and verified using the manually collected image dataset. The model's similar training and validation accuracy shows that it is generalizable and has a strong fit to the data.

III.   EXISITING SYSTEM

Individuals frequently desire to operate various equipment from a distance when they are away from the house for a variety of reasons, such as travel. For instance, they desire complete control over their house, the ability to switch off the light, use electrical gadgets in the room, and feedback on the temperature. No automatic motion detected device control. There is no environmental condition based device controlling and monitoring. No Device status update to the family members.

IV.   PROPOSED SYSTEM

The proposed system has a great feature of face recognition for security. Designing and implementing a home automation and security system utilizing Arduino and image processing is the primary goal of this research (laptop). The most important component taken into account by this approach is time management. specific monitoring Only when an intruder is present and utilising a GSM modem does the system provide an alarm. security system using only one camera. Memory management requires focus. IOT-based technology for home automation.

A.   Security system

Modern interior security systems incorporate a variety of sensors, including infrared detectors, microwave sensors, photoelectric sensors, and ultrasonic sensors. These systems all have their own setbacks. For instance, photo-electric beam systems broadcast beams of infrared or visible light a region, where these beams may be occluded, to detect the presence of an intruder. If the intruder is aware that this mechanism is in place, however, that is where the downside resides. detection parameter due to its ease of usage and advantage in interacting with digital systems. It is now widely

employed for applications such as power management, smart environment sensing, and intrusion detection. Many studies have been carried out in several applications. Intelligent alarm system that is theft- and fire-proof.Home Automation

This system is mainly implemented by sensors by using Raspberry Pi as the controlling device. The sensors like fire sensor and gas sensor along with the relay is interfaced with the Raspberry Pi. The GSM modem in case of home automation is used provide alert in case of emergency situations. With energy saving concept automatic controlling of all electrical or electronic devices in homes through wireless communications. The home automation system will control home devices like lighting when it is connected with internet using IOT.
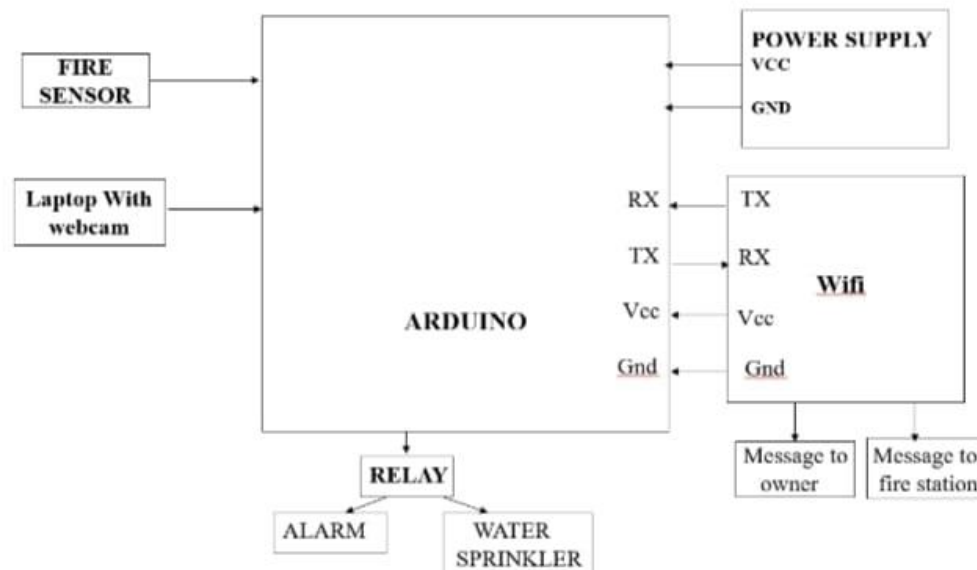

Figure 2: Home Automation Device.

a.   Adruino Device

An Arduino serving as the central controller receives instructions to execute. Via an Arduino-mounted Wi-fi shield, you may access the Internet. On the user's end, offers a portable access to the entire system through a simple application. The central control unit's mobile device may be connected wirelessly or via a wired link (such as a USB cord). The Wi-Fi shield is located on the main console, wireless communication may be gained inside the house.

b.   Input and Output Block

The input/output block uses two PIR (Passive Infra-Red) motion sensors and an LM35 temperature sensor as inputs and a variety of lights, sockets, relays, and buzzers as outputs. PIR sensors are employed in order to detect motion. The sensor data are utilised to turn off the lights if there hasn't been any action recently, and to turn them on if there has Moreover, this sensor functions as an input for some sockets. After the temperature reaches a particular point, the socket will turn on. When connected to the socket, this situation will turn on a fan or an air conditioner (AC). Figures 5 and 6 depict the connection circuit between a PIR sensor-equipped microcontroller system and an LM35 sensor is made up of buzzer and relays. When there is suspicious movement, the buzzer acts as an alert. Relays that are linked to sockets and lighting [8].

c.   GSM Modem Interfacing

[1] Some notable works that have been finished in the past employing this sensing technique include persons tracking systems [3], intruder detection systems [4], and home security systems based on the GSM (Global System for Mobile) network [2]. There should be a low-cost security system put in place. the owner of the system is informed and alerted through the usage of the present cellular network. There has been a security breach in order to address the need for cost-effective, trustworthy security solutions.

d.   Relay Circuit

The smart switch equipment is connected to the existing wiring of the electrical appliances in the house, such as a lamp and ceiling air conditioner, in order to receive electricity. This gadget will be powered by the life and neutral of the household supply that are connected to the power module. 240VAC is converted to DC using a 5V rectifier type DC power supply Wi-fi adaptor. The relay circuit is shown in Figure 10. The relay module functions like a typical switch to turn on and off a lamp. With an infrared detection system, an infrared sensor acts as the input, and the starter for the relay module is the Arduino Wi-Fi adapter. A reliable RF module for use with wireless devices is the Wi-fi.

Figure 3: System overview

We need to add more because of the SPI implementation and the fact that the Arduino Wi-Fi Shield interfaces with the Arduino board via SPI. The database data is sent on the same web server that hosts the website in order to display the data that is in a changing state. The hosting server's web page may read and change database data. Developing the Web Client's Code. By pushing the "ON" or "OFF" button, it may also read and update data stored in the database, much as on a webpage. This smart switch gadget allows a lamp to be operated remotely via an Android app or manually using an infrared switch detection technology.

V.   CONCLUSION

 The proposed system provides alert only in the presence of intruder using GSM Modem. This initiative will benefit the deaf and hard of hearing. This project shows how to develop and implement an app-based interactive IOT-enabled home door security system. The user may remotely monitor and control entry into the home. The security system and the administrator's smartphone will both sound an alarm in the event that the technology detects any unauthorized attempts. This technology offers an additional level of protection and control over traditional locking security systems. In conclusion, the Internet of Things will influence connection. This makes it possible for a number of everyday objects to be quickly linked to the internet, allowing users to control their equipment remotely from home.

ACKNOWLEDGEMENT

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