Anti Theft Security System Using IoT

Dr. M.Sangeetha[1] , Ms. Dhivya G[2] ,Mr Gokul A G[3]

[1]Associate Professor, Department of Computer Science, Dr.N.G.P Arts And Science College, Coimbatore-48,Tamil Nadu,India.
[2,3] II Msc Computer Science, Dr.N.G.P Arts And Science College, Coimbatore-48,Tamil Nadu,India.

ABSTRACT

The Internet of Things (IoT) is revolutionising how we live and work, and intelligent security systems are a key component of this change. In this paper, we provide an Arduino-based security system which makes use of a PIR sensor, door sensor, buzzer, and Bluetooth module in order to offer a low-cost and simple-to-implement option for protecting homes and businesses. A PIR sensor that detects motion within its field of vision and a door sensor that determines whether the door is open or closed are both included in the system. In order to notify the user, the system triggers a buzzer if the PIR sensor detects movement and the door sensor detects that the door is open. Additionally, the system utilises the Bluetooth module to instantly notify the user's computer or mobile device through a notification of the effective security breach. The user can directly arm or disarm the security system using a computer or mobile device, depending on their needs. The sensitivity of the sensors can be changed, and other features like cameras or alarms can be added to further customise the system.
Keywords: Passive Infrared Sensor, Bluetooth Module(HC-05),Door Sensor,IoT,Buzzer.

I. INTRODUCTION

The Internet of Things (IoT) has completely changed how we engage with technology by allowing devices to speak to users and to one another in previously unheard-of ways. Security systems for homes and businesses are one area where the IoT age has seen significant innovation. Security systems have improved as a result of the rise of smart homes and workplaces, with sensors, cameras, and other devices offering real-time monitoring and alerts. In this paper, we suggest an Arduino-based security system that employs a PIR sensor, door sensor, buzzer, and Bluetooth module to offer a low-cost and simple-to-implement option for protecting homes and businesses. The system is intended to identify possible security breaches, notify users in real-time, and enable remote monitoring and control using a computer or mobile device. The door sensor determines whether the door is open or closed, while the PIR sensor detects motion within its field of vision. The buzzer sounds to notify the user if the system notices motion and the door is open. Additionally, the system uses the Bluetooth module to send a notification to the user's computer or mobile device, alerting them right away to a possible security breach. Through the use of a computer or mobile device, the user can also directly control the security system, arming or disarming it as necessary. The proposed Arduino-based security system offers a straightforward and affordable method for installing smart security systems in residences and commercial buildings. This system has the potential to become a well-liked option for those looking to protect their premises with little setup and expense as IoT devices proliferate.

II. LITERATURE REVIEW

The paper "Theft Prevention System using IoT" describes a system that uses sensors and cameras to monitor an area, and an AI algorithm analyzes the data collected to detect potential theft. the system sends an alert to the owner or security personnel if suspicious activity is detected, and it can also be programmed to trigger an alarm or other response. the paper discusses the technical details of the system and the advantages and disadvantages of using IoT to prevent theft.[1]

"Internet of Things and Smart Home Security" is a paper that examines how IoT technology might improve smart home security. The introduction of smart houses and the possible security threats they bring serves as the opening of the essay. In order to monitor and secure the home, the author then suggests a solution based on IoT technology. The system consists of several sensors and gadgets that gather information and transmit it to a central hub where an AI algorithm analyses it. The advantages of the system—which include the capacity to keep an eye on several aspects of the house and adapt it to meet particular needs—are covered in length in the paper, along with some of its technical aspects.[2]

IoT-based anti-theft security system is described in the paper "IoT Based Anti-Theft Security System" by Mohd Musab. In order to identify probable theft and notify the owner or security professionals, the system makes use of sensors, cameras, and an AI algorithm. The advantages of the system, such as the capability to remotely monitor various sites and modify the system to suit particular demands, are covered in the paper's technical specifics. Overall, the paper offers an all-encompassing IoT-based solution to the issue of theft.[3]

The paper "Security System with PIR Sensor" suggests a security system that use a passive infrared (PIR) sensor to look for movement and sound an alarm. The PIR sensor monitors changes in the infrared radiation generated by objects in its range of vision. The system is intended to monitor a particular location, such as a home or office. The owner or security professionals are informed when the sensor detects movement by an alarm. The benefits of using a PIR sensor for security applications, including low power consumption and high sensitivity, are discussed in the article along with the technical specifications of the system. The author also provides experimental findings that show how successful the system.[4]

III. A) HARDWARE SPECIFICATION

a)PIR Sensor

An electrical device called a passive infrared sensor (PIR) uses the infrared (IR) radiation that is released by a heated item or body within its field of view to detect movements. PIR sensors are frequently employed in security systems, automatic lighting systems, and other motion-detecting applications.A PIR sensor's primary function is to detect changes in the amount of infrared radiation present in its field of view. The infrared radiation levels detected by the sensor fluctuate along with the temperature of the object when a person or an object moves within its detecting range.

FIG 3.1 PASSIVE INFRARED SENSOR

b)Door Sensor

An electronic device known as a door sensor is used to track when a door or window opens and closes. A magnet and a sensor make up both of its sections. The sensor is often positioned on the door frame or window sill, adjacent to the magnet, which is typically installed on the door or window. To detect unauthorised access, door sensors are frequently employed in security systems. In order to warn the user of a potential intruder, the sensor detects when a door or window has been opened and gets on an alarm or sends a notice to the security system. When a given event occurs, such as when a room is filled or vacant, door sensors are also utilised in automation systems to cause the opening or closing of doors or windows.
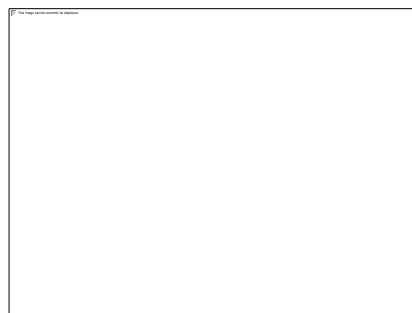

FIG 3.2 DOOR SENSOR

c)Bluetooth Module

The HC-05 Bluetooth module is a wireless communication device that transmits data between two devices using Bluetooth technology. It is an affordable option for wireless serial communication that is simple to include into a variety of electronic projects. This bluetooth module can support data rates up to 2.1 Mbps and has a range of up to 10 metres (33 feet) in open space. It can be powered by a 3.3V to 5V DC power supply and features an integrated antenna.

FIG 3.3 BLUETOOTH MODULE (HC-05)

D)Buzzer

A buzzer is a type of electronic gadget that emits an audible sound in response to an electrical signal. It is an easy and economical method for producing sound in many electronic applications.

FIG 3.4 BUZZER

B) SOFTWARE SPECIFICATION

ARDUINO IDE:

The Arduino IDE is a piece of software that offers a simple user interface for creating, developing, and uploading code to Arduino microcontroller devices. It has capabilities including a code editor, serial monitor, library manager, and board manager. It is open-source and free to download, making it simple for newcomers to begin programming with Arduino.
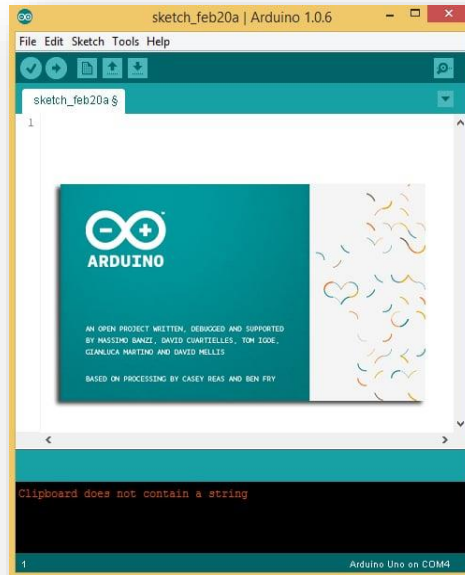
FIG 3.5 ARDUINO IDE

IV. WORKING PROGRESS

1.   Door Sensor:

•   Door sensor has two pins.connect the one pin of door sensor to Arduino's digital pin and other pin to the ground (GND).

2.   PIR Sensor:

- PIR sensor has three pins:VCC,GND and OUT.connect the PIR sensor VCC to 5V,GND to GND and OUT to digital pin of the Arduino board.

3.   Buzzer:

- Buzzer has two pins:Positive(red),Negative (black).Connect the Positive(red) to digital and Negative (black) to GND of the Arduino board.

4.   Bluetooth Module:

- Bluetooth Module has four pins:VCC,GND,TXD,RXD.connect the VCC to 5V ,GND to GND to Arduino board.connect the TXD to Ardunio's RX(receive) pin and RXD to TX(transmit)pin.
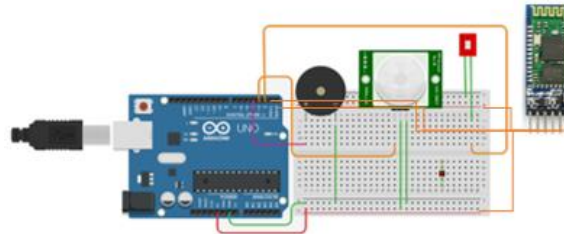

FIG 4.1 CIRCUIT DIAGRAM

V. CONCLUSION

The proposed Arduino-based security system, which incorporates a PIR sensor, door sensor, buzzer, and Bluetooth module, is a practical and affordable method of installing smart security systems in homes and businesses. The system is able to identify potential security breaches, notify users in real-time, and provide remote monitoring and control via a computer or mobile device. It offers a trustworthy and user-friendly security solution that can be expanded and customised to the user's needs.

VI.FUTURE SCOPE

Future applications for PIR door sensors used in anti-theft security systems are quite promising. There are several security uses for the PIR door sensor, which can detect motion and changes in heat signatures. These systems have the potential to be integrated with other systems or smart home gadgets, making it simpler to keep an eye on and manage security. PIR door sensors can be used in industrial settings to track the movement of people and equipment, as well as in retail establishments to look out for suspicious behaviour. PIR door sensors can be used in healthcare institutions to monitor entry to sensitive areas and transportation systems to increase passenger safety. The potential for anti-theft security systems using PIR door sensors in the future is positive and provides opportunity for a variety of businesses.

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