

Burglar/Intruder Detection and Alert System Using Esp8266 and Android Application

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Abstract

As the country's housing stock grows, so does the number of burglaries and other crimes. Burglary is an unwelcome occurrence that no one wants to occur on their property. It is, however, difficult for everyone to remain vigilant at all times in order to defend their property or identify an unofficial entry. As a result, an IoT-based burglar/intruder detection and alert system is required to prevent interruption to every home and resident, particularly as crime rates rise. This paper demonstrates the use of low-cost, low-power consumption wireless security technologies to construct a security system for homes or businesses. These systems can be used to protect banks, offices, and other places. This paper is about an eco-friendly burglar/intruder detection and alert system based on the ESP8266 microcontroller. This ESP8266 module will lower the system's cost and power usage. When there is presence of intruder, the owner will receive a notification via an Android Application. As a result, the user gets alerted.

Keywords: *IoT, ESP8266, Burglar detection, Sensors, Android Application.*

INTRODUCTION

Because we live in the twenty-first century, where crime is on the rise, every person wants to secure their home, offices, and

banks. Enhancement occurs at a breakneck speed and in a wide range of forms [3]. As a result, new technology and approaches emerge and are implemented as needed. In

such a complex environment, ensuring the safety of one's house has become a big worry. Security cameras can now be employed for this purpose. But, low-income home owners may be unable to buy such a system.

In this project, an effort is made to develop a home security burglar detection alert system using ESP8266 and an Android app. Programming of NodeMCU is used for software coding with the help of Arduino IDE. When an intruder is detected, an alert message with a buzzer sound is delivered to the owner's phone via the Android Application.

INTERNET OF THINGS

The communication of devices like sensors, software with internet is Internet of Things (IoT). The Internet of Things is a network of physical objects or "things" that are integrated with electronics software, sensors [1].

NodeMCU – ESP8266 WiFi Development Board

NodeMCU is an Internet of Things (IoT) module based on the ESP8266 WiFi module. Arduino IDE can be used to program NodeMCU.

ESP8266

It's a Wi-Fi module as well as a microcontroller that makes connecting sensors to the internet a reality. It costs less than five dollars.



Figure:- (a) shows the NodeMCU



Figure:- (b) shows ESP8266 Wi-Fi module

Ultrasonic Sensor

An ultrasonic sensor is an electronic device that uses ultrasonic sound waves to detect the distance between a target time and converts the reflected sound into an electrical signal.



Figure: - (c) Shows the Ultrasonic sensor

Above figure shows the circuit diagram of the mentioned proposed system. Here, in the design of Burglar detection and alert system, we have made a security system that can control via NodeMCU and we have given the input from the adopter at the point of 5V and 2.7A. Then, the voltage and current will provide to the NodeMCU and NodeMCU will work, take the data input from these three senses. The IR sensor in this project is working for the activation of this circuit. Then, the ultrasonic sensor will calculate the distance from one wall to another wall and if someone passes through this wall, then

this sensor will send the signal to NodeMCU and NodeMCU will communicate to the server, and the server will send this data to the android app.

When someone crosses the door/gate, then this system will activate and send the data to the server & server will calculate all these things. When server detects someone is entering in room, then the application will also show the activities in the room and if we are not entering instead someone else is entering then, we can operate the buzzer from our phone.

EXPERIMENTAL RESULT



Hardware Implementation

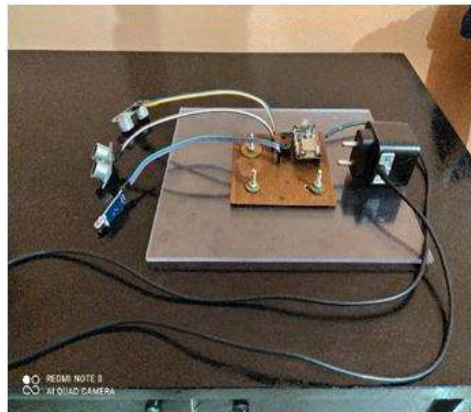


Figure:- (e) shows Hardware of Complete Project

Following the hardware implementation of the above-mentioned project, we will concentrate on the software portion of the experiment to complete it.

The webserver is installed on the Windows PC in the current system, allowing the intrusion to be controlled or detected using the device on which the webserver is installed. This can be further developed by installing a cloud-based webserver. The benefit of putting a web server on the cloud is that any device with Wi-Fi and a web server can keep your house or business safe. A notification is sent to the mobile app as soon as motion is detected. The android application is made in the Android Studio and we have purchased the Firebase Database for this android studio set-up. Following are the interfaces of our android application:

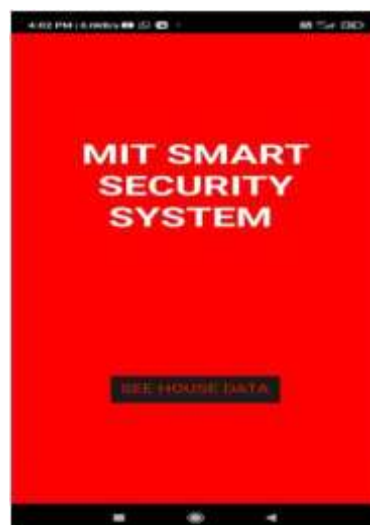


Fig. (f)



Fig. (g)

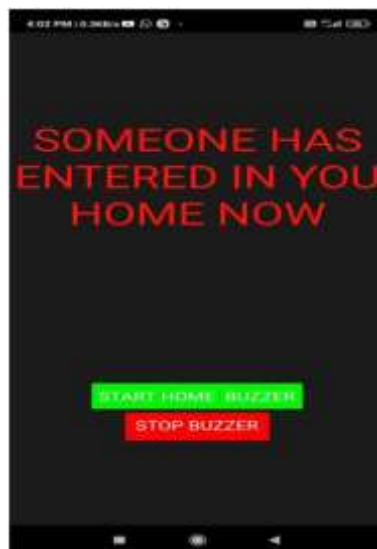


Fig. (h)

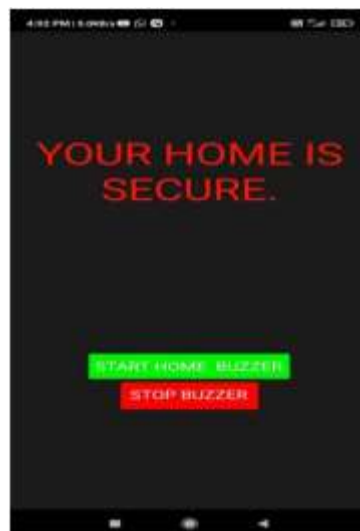


Fig. (i)

CONCLUSION

The project “Burglar/Intruder detection and alert system using ESP8266 and Android Application” was made and tested successfully. It was created by integrating functionality from all of the hardware components used. The project is completed successfully thanks to the advancement of technology.

Embedded systems are coming out as a high-potential technology. The industry has dominated by Microprocessor-based embedded systems in previous decades. Microcontroller-based embedded systems have seen a transformation in the recent decade.

Future Scope

Since, the system has various applications like Home Automation security system, Attendance system, can be used as counting system and much more. Automation and the Internet of Things are growing in popularity, and these technologies are having a significant impact on humans. The project will be a low-cost, eco-friendly intruder detection and alert system with the help of ESP8266 and an Android application, an IoT Webserver, and Wi-Fi, with a bright future.

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