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SMART INTRUDER DETECTION SYSTEM USING IOT TECHNOLOGY

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ABSTRACT

The purpose of the intruder detection system is to alert people to the entry of intruders or any other person into designated areas, including private areas, restricted regions, and domestic home applications. By alerting the owner or gardener via the registered applicationwhen it detects an intruder in the area, the intruder detection system prevents theft and unauthorized entry into restricted areas. This work proposes the use of an Internet of Things (IoT) based intruder detection system called Smart-IDS to prevent anyone without specialized personnel from entering the target place. The Node MCU and ultrasonic sensor in the suggested Smart-IDS are used to detect the intruder, and the cloud-based Blynk application is used to notify the user of the alert. The suggested Smart-IDS has produced more effective results in the testing.

INTRODUCTION:

Nowadays, when everyone's life is geared toward progress, privacy and personal security have significantly declined. It isbecoming increasingly difficult to find a safe area for people to live, and there are an increasing number of theft instances. In other extremely violent criminal situations, the burglars killed numerous residents in exchange for money [1]. These kinds of criminal cases are growing more frequent by the day. More often than not, these tragedies occur on private property, in tiny communities, and in specially built places. Individuals select manual security measures such as security guard systems. However, this has led to failure as the robbers are using lethal weapons to kill anyone who tries to stop them when they break into properties. Numerous Security To find the intruder in the target area, numerous security methods have been presented and are currently being deployed in a variety of situations. The rise of IoT has given rise to a number of ways to improve various smart settings and applications, among other things. The Internet of Things has been widely applied in all fields, including agriculture, industry, security systems, and medicine [2].

Figure 1 Intruder Detection System

A common Internet of Things application is the smart home, which connects all of your electronic equipment to the internet so they are always conveniently available. An internet of things-based smart house, including a home security system, has been the subject of several research. The benefits of IoT have spurred researchers to use the technology to address the problem of trespassers breaking into homes and other private spaces. We developed an automated system using an ultrasonic sensor and microcontroller in this study, which we named the "Smart Intruder Detection System" (Smart - IDS). Any private

location, such as a house, will have this connected at the entry point. When someone enters the home when no one is there and they seem suspicious, The owner's phone will receive a notification. A voltage regulator that is attached to the Arduino of the GSM module will power this entire system. The bylnk application will deliver this notification to your mobile device. The suggested system doesn't need human interaction.

This is how the remainder of the paper is structured: The literature that is currently accessible that is related is covered in section 2. The merits and demerits of the current body of work are examined. The proposed system for this work is described in Section 3, together with the system design and the components that make up the proposed design. The outcomes of the experiment are discussed in Section 4, and the study is concluded and future directions for this work are provided in Section 5.

LITERATURE SURVEY:

A number of Intruder Detection Systems (IDS) have been presented in the last ten years to solve the security concern of intruders breaking into residences. These intrusion detection systems (IDSs) actively identify the home's owners and detect any unauthorized entry. An Internet of Things

(IoT) based intruder detection and monitoring system that uses an Arduino Nano controller to detect motion was proposed by Taryudi et al. [3].

things in front of the entrance. The home is being watched over by the PIR sensor. Only those with an RFID access card who are allowed can enter the house. Closed-circuit television (CCTV), the technology used in traditional home security systems, is limited to video collection and recording. It is unable to provide alerts or feedback in the event that it detects suspicious activity. As a result, a second object detection and warning technique is needed.

A detection system with a motion sensor, camera, and Raspberry Pi connected has been proposed by Nico Surantha et al. [4]. The SVM is used to identify any suspicious objects or people approaching the door.

In order to detect theft, Wahyuni et al. [5] created a home security alarm system that used the WEMOS D1 and HC-SR501 Sensor along with Telegram Notification. It aids the neighborhood in addressing residential theft. The WEMOS D1 microprocessor is responsible for controlling the pear sensor, which detects motion, and the buzzer, which sounds an alarm when motion is detected. When motion is recognized, a notificationautomatically appears in the Telegram application. If someone enters the house while it is unattended, this technology can verify it immediately. Anwar et al. [6] presented a concept for an alarm-equipped home security system that makes use of Internet of Things (IoT) devices that can access and operate the home door from afar with a smartphone. The security system is brought to life in response to requests thanks to a PIR motion sensor and a camera module, which are used, respectively, to detect motion and take pictures. The door accessibility is controlled by an electromagnetic door lock module, which has been developed and designed.

In order to improve home security, Nwalozie et al. [7] have designed an intruder detection system that will notify the homeowner by SMS whenever the PIR sensor detects motion at the front door. Additionally, an SMS will be sent to the home owner and an LCD monitor attached inside the house will display a message thanks to a switch near the entrance that is coupled to microcontroller.

A home security system designed by Mrunal Khedkar et al. [8] would only activate the digital camera in response to an actual intrusion detected by the motion sensor. The camera instantly turns on after triggering and begins collecting visual data. Using a Zigbee or Bluetooth transmissionmodule, this captured visual data is sent serially to the base station. A home security system designed by Mrunal Khedkar et al.[8] would only activate the digital camera in response to an actual intrusion detected by the motion sensor. The camera instantly turns on after triggering and begins collecting visual data. Using a Zigbee or Bluetooth transmission module, this captured visual data is sent serially to the base station. Visual data is obtained at the base station by decoding the received information.A low-cost intrusion system using a microcontroller and a collection of sensors is proposed by Saikumar et al. [9]. The central processing unit, an AVR Atmega 8A, has been employed; a GSM module will be used to facilitate efficient connection with the program.Numerous security systems have been suggested to identify trespassers entering the home. Several systems employed motion sensors to identify if someone was inside the home or not. A later intrusion detection system using facial recognition and camera sensors linked to a microcontroller was created. To keep attackers out of the house, security measures must still be strengthened. We used IoT devices in our project to identify the invader and instantly notify the home owner of the intrusion.

3. Proposed system

By identifying intruders inside the homes, the Smart-IDS technology is intended to improve the security of smart homes. The

suggested Smart-IDS system's system architecture is depicted in figure 3.1 below.

A.System Architecture

The detailed structure of the proposed system is given the following figure 2.

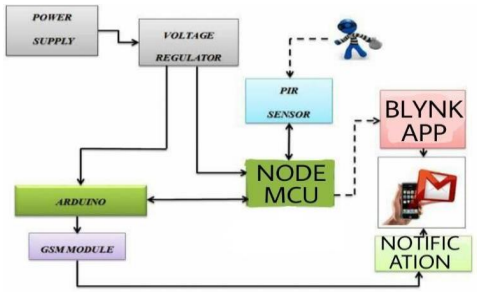

Figure 2 Architecture of the Proposed smart- ID

Overall this block diagram of intruder detection represents the connection between the manual setup to owner's mobile. As the power supply with voltage regulator connected to Arduino is connected to node mcu with PIR sensor. As this mcu is a web based connected to a blynk application by wifi . when any intruder enters that will be sensed by nodemcu and by bylnk notification will be sensed through gsm module.

B. Node MCU

The ESP-12E module, which has an ESP8266 chip with a 32-bit LX106 RISC microprocessor from Tensilica, is included with the MCUboard [9]. The microprocessor runs at a clock frequency of 80MHz–160MHz and supports Real Time OS. The MCU can store data and applications in its 4 MB of flash memory and 128 KB of RAM. Its powerful processor and built-in Bluetooth and wifi make it perfect for IoT projects.Micro USB jacks are used to power MCUs.

C. Ultrasonic Sensor

Ultrasonic sensors, sometimes known as proximity sensors [10], are utilized in robotic obstacle detection systems in industrial technology, automobiles, self-parking technology systems, and in infrared proximity sensing devices.

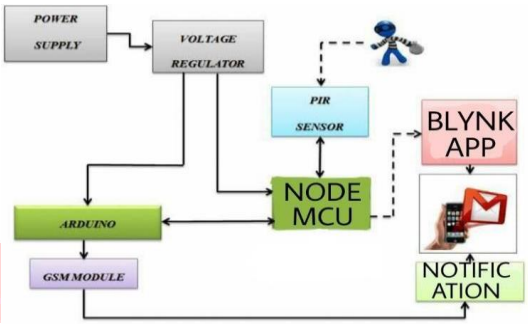

Figure 3.Node MCU Microprocessor

D. Node MCU

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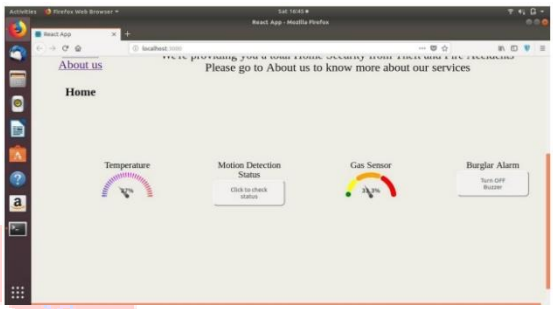
Figure 4. Arduino Board

Experiments and Results

Our suggested intrusion detection system is a simple, universally accessible technology. In our system, we have incorporated IoT technology. These days, Internet of Things technology is so popular that everyone uses it. We may turn our house into a smart home and have interactions with the objects around us by using IoT devices. This is how our system interacts with the surroundings; at the door where our system will be installed, an ultrasonic sensor detects people or intruders. Following that discovery, we sent messages to the user known as "Blynk" using an application. This application detects intruders and sends an alert to the user based on the message we provide. It also sounds an alarm in the house to let us know that someone is at the entry. This lets us know who is attempting to enter the residence and sends us a notification about it. The internet is the key component of our suggested system. To get notifications from any Wi-Fi module or the Internet, we must connect both the mobile device and the system. Since we created the system utilizing the Internet of Things, or IoT, our system primarily functions online.

In this proposed System, The ultrasonic sensor in this suggested system detects people or intruders effectively. Additionally, one can readily comprehend how the Arduino and all of its components work thanks to their user-friendly design. Blynk is an online tool that works with iOS and Android apps to control devices like Arduino, Raspberry Pi, and other similar devices. To transmit the notification,



we employed a digital dashboard. Additionally, almost every place these days has access to the Internet, even homes. That's good for our system as well. Thus, the outcomes of our suggested approach are successful and productive. Our suggested approach is affordable for the average Indian citizen and doesn't cost much.

CONCLUSION:

In this research, we provide a rudimentary Internet of Things-based intruder detection system. The burglar is detected at the door's entrance by our suggested Smart-IDS. An individual is detected at the entry by the ultrasonic sensor. The user receives an alert message on this detection. The Node MCU, which processes the sensor signal and transmits a notice via the Blynk framework, is connected to all of these setups. Because the Smart-IDS has fewer components, it is less expensive and simpler to operate. In the

future, this work's reach could be expanded to include facial detection through the use of a camera and mobile phone monitoring. The nearby police station can receive the live feed from the camera for additional action.

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