INTRUDER ALERT SYSTEM USING IOT

A MINI PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

The intruder alert system using IoT and NodeMCU with Motion sensor and Telegram bot describes a security system that utilizes the Internet of Things (IoT) and NodeMCU technology with Motion sensor and a simple AND RTL logic with a Telegram bot to send alert message by detecting and alerting homeowners of any intrusions in their homes. The sensors detect any movement or changes in temperature and send this information to the NodeMCU device which is connected via WiFi. The NodeMCU device processes this information and sends a message to a Telegram bot that alerts the homeowner's mobile phone or desktop if an intrusion is detected. The system is user-friendly, cost-effective, and easy to install, making it an ideal solution for homeowners looking for an efficient and reliable security system especially for old people who are staying home alone. The integration of the Telegram bot allows for remote monitoring and control, adding an additional layer of convenience and security to the system.

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LIST OF ABBREVIATION

UGV	Unmanned Ground Vehicles
I/O	input/output
PWM	Pulse width modulation
TTL	Time-To-Live
LED	Light Emitting Diode
DC	Direct Current
IDE	Integrated Development Environment
RPM	Revolutions per minute
GNU	GNU's Not Unix.
SLAM	Simultaneous localization and mapping
EXT-PWR	External Power

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

The intruder alert system using IoT and NodeMCU with IR sensor and Telegram bot describes a security system that utilizes the latest advancements in technology to provide homeowners with a reliable and efficient solution for detecting intrusions in their homes. With the rise of the Internet of Things (IoT) and NodeMCU technology, it has become easier and more cost-effective to develop smart security systems that can be controlled remotely using mobile devices and the internet. The proposed system incorporates IR sensors to detect any movements or changes in temperature and sends this information to theNodeMCU device, which processes the data and sends a message to a Telegram bot. The Telegram bot then alerts the homeowner's mobile phone or desktop if an intrusion is detected. This provides a more convenient and efficient way of monitoring and controlling the security system remotely. The proposed system is cost-effective, user-friendly, and easy to install, making it an attractive option for homeowners who want to secure their homes. The use of IR sensors and Telegram bot integration provides an added layer of security and convenience to the system, making it an ideal solution for modern-day home security needs. In recent years, there has been a significant increase in the number of intrusions and burglaries in residential areas. This has led to an increased demand for home security systems that are reliable, easy to use, and cost-effective. Traditional security systems such as alarms and CCTV cameras can be effective, but they are often expensive and require professional installation. The proposed intruder alert system using IoT and NodeMCU with IR sensor and Telegram bot addresses these issues by providing a cost-effective and easy-to-install solution for homeowners. The use of IoT and NodeMCU technology allows for wireless communication between the various components of the system, making it easy to install and configure. The use of IR sensors provides accurate and reliable detection of intrusions while the Telegram bot integration allows for remote monitoring and control of the system.

CHAPTER 2

LITERATURE SURVEY

2.1 LITERATURE REVIEW

[1] Development of Cloud Integrated Internet of Things Based Intruder Detection System

Author; Dr.M Kaliappan.,Vimal Shanmuganathan

Publication/Year; Journal of Computational and Theoretical Nanoscience 15(11):3565-35700, November 2018.

Internet of Things (IOT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet. When it comes to our house, this concept can be aptly incorporated to make it smarter and safer. This paper focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Today security and safety is becoming more and more popular day by day due to its numerous advantages, and with such advancement happening the security of one's home must also not be left behind. Nowadays theft is on rise, so there is an endeavor to build a security system which will effectively manage this issue keeping user away from fear about home security in all cases. The proposed system detects the presence of human appearance with PIR sensor, which will notify the user through video captured by camera and sends it to android application using internet, it also sends a message through GSM.

[2] Home Automation and Security System with Node MCU using Internet of Things

Author;K. Lova Raju,V. Chandrani

Publication/Year;International Conference on Vision Towards Emerging Trends

in Communication and Networking (ViTECoN), March 2019.

Internet of Things is composed of things that have unique identities and are connected to each other over internet. It is simply connecting and monitoring various devices and sensors through Internet. This paved the way for home automation and monitoring which makes human life more comfortable and secured. This paper describes the overall notion of the IOT based sensing systems and monitoring systems for implementing an automated home. The proposed prototype uses Node MCU board with internet being remotely controlled by Android OS smart phone. Node MCU is the heart of this system and it can perform as a micro web server and it acts as an interface for the wide range of hardware modules. To control lights, fans and other home appliances which are connected to the relay system, the system offers switching functionalities. It is also used for environmental monitoring by sensing and analyzing data about temperature and humidity. Another notifying feature in this system designed is the intrusion detection which is offered by this system using motion sensor. All these activities are controlled by using Android mobile app-Blynk.

[3] INTRUDER ALERT AND SECURITY SYSTEM

Author ; [Yarlagadda Ramakrishna]

Publication/Year ; International Journal of Engine Research 6(1):469,November 2020 .

Security system are very important in present Society as there is a increase in criminal activities every day. With the technological advancements a individual doesn't have to worry about providing a security to his/her home or property. The aim of project is to implement a security device that detects the motion of a intruder, sends a message to owner and captures the picture of intruder. PIR sensor detects the motion by sensing the difference between the infrared or radiation heat levels sensed by the surrounding objects. The PIR

sensor output goes high if detects any motion, then the sensor sends a high pulse to camera shutter module. By using camera shutter module the wireless camera captures the image of intruder. GSM sends a message to the owner that intruder alert..

[4] IoT Based Smart Intruder Detection System For Smart Homes

Author ;Vijayaprabakaran Kothandapani

Publication/year; International Journal of Scientific Research in Science and Technology, July 2021.

The intruder detection system is targeted for the private areas, restricted areas and for the domestic home applications to notify the entrance of the intruder or any person to the specified areas. The intruder detection system eliminates the theft and entrance of the persons to the restricted areas by notifying the owner or the gardener through the registered application when the system detects an intruder in the locality. In this work an IoT based intruder detection system named Smart-IDS is proposed to avoid the entrance of the person without any special workforce for the target location. The proposed Smart-IDS detects the intruder using the Node MCU and Ultrasonic sensor and the cloud based Blynk application is employed to send the alert notification to the user. The experiments with the proposed Smart-IDS has performed more efficiently.

[5] IoT based smart intruder system for baby monitoring

Author; J. Frank Vijay

Publication/year; ISET INTERNATIONAL CONFERENCE ON APPLIED SCIENCE & ENGINEERING (CASE 2021),March 2023.

It is difficult for parents to properly feed their children, especially if both parents are employed. The next intolerant thing is to give someone 24 hours. As a result, must devise something special that will assist parents in providing constant care and monitoring for their children. As a result, came up with the idea of an Internet of Things (IoT)-based Smart Cradle

System that will allow parents to keep tabs on their children even while they are away from home and track their every move. The cradle system is innovative, smart, and safe for taking care of a baby quickly. This method includes all of the tiniest features required for the baby's care and safety while in the cradle. It also includes several features that will help parents keep tabs on their newborns and keep them informed about how they're doing. An eight-day-old baby died in the Darbhanga district of Bihar's government hospital's neo-natal urgent care unit, allegedly from rat bites. The incident was made public when the mother went to breastfeed the baby in the morning. The incident occurred after the workers at the Darbhanga Medical College and Hospital (DMCH), located around 145 kilometres east of Patna, had gone home for the evening. The parents were natives of Madhubani's Najra town. They claimed that the baby's death was caused by a rat bite because blood was seeping from the boy's toes and fingers, which had been injured and scarred. Everyone at the hospital has a distinct reason for wanting to keep such an incident from happening again. However, it was completely ignored by the parents. They stated that the child was admitted to the hospital in a severe condition and that only the therapy had been unsuccessful so far. However, the wounds discovered on the infant's body prove that the occurrence occurred as a result of the hospital administration's negligence. Because of the lack of infant monitoring, horrific occurrences like these occur all the time, not just in one hospital. This Smart Cradle with Intruder Alert System will be an effective defence against such occurrences.

CHAPTER 3

REQUIREMENT AND SPECIFICATION OF PROPOSED WORK

3.1 EXISTING INTRUSION DETECTION SYSTEMS:

An intrusion detection system basically includes CCTV/webcam, alarms, SMS and various sensors. Different technologies have advanced over the years in the monitoring, detection and control of security systems. These ranges from systems that allow compactible products to communicate with each other through wired connections to wireless connections. Wireless intrusion security systems today can easily control the home or office mechanical systems and applications over cellular phone or internet. GSM technology nowadays provides a viable ubiquitous access to most systems security and control. [2] identified that CCTV's record most places such as banks continuously but do not absolutely detect the moving object and so designed real time security system using human motion detection to develop a system to monitor the area via web camera installed at restricted locations to capture live images and stores it for further evaluation. added an alarm alert to CCTV image and video record of the security system in the farm. However, stated that CCTV camera is expensive due to the use of computer and human effort to detect unauthorized activity. However, recommended Raspberry PI module system to be cheaper for better resolution and low power consumption

3.2 HARDWARE REQUIREMENT

1. ARDUINO NANO
2. NODE MCU
3. BUZZER
4. TRANSISTOR
5. RESISTOR
6. POWER SUPPLY

3.3 SOFTWARE REQUIREMENT

The Arduino sketch used is attached here Upload and run it. I used Arduino 1.6 12IDE. It is recommended to run it with debug-true in the beginning in order to time the number of pulses per measurement. Best is to have an ADC reading

between 200 and 300 Increase or decrease the number of pulses in case your coil gives drastically different readings.

The sketch does some sort of self-calibration. It is sufficient to leave the col quiet away from metals to make it go quiet. Slow drifts in the inductance will be followed, but sudden large changes will not affect the long-term average.

CHAPTER 4

ARCHITECTURE OF PROPOSED WORK

4.1 ARDUINO NANO

Arduino is an open-source platform which is used to develop electronics projects. It can be easily programmed, erased and reprogrammed at any instant of the time. There are many Arduino boards available in the market like Arduino UNO, Arduino Nano, Arduino Mega, Arduino lilypad, etc with having different specification according to their use. In this project, we are going to use Arduino UNO to control home appliances automatically. It has ATmega328 microcontroller IC on it which runs on 16MHz clock speed. It is a powerful which can work on USART, 12C and SPI communication protocols. This board is usually programmed using software Arduino IDE using a micro USB cable.

ATmega328 comes with preprogrammed onboard boot loader which makes it easier to upload the code without the help on external hardware. It has vast application in making electronics projects or products. The C and C++ language is used to program the board which is very easy to learn and use. Arduino IDE makes it much easier to program. It separates the code in two parts i.e. void setup() and void loop(). The function void setup() runs only one time and used for mainly initiating some process whereas void loop() consists the part of the code which should be executed continuously. In this area the code which are needed to be executed repeatedly are written. This functionality in this Arduino board which makes it more versatile and application specific. This model consists of 6 analog input pins and 14 digital GPIO pins which can be used as input-output, 6 of which provides PWM output and analog using pinMode(), digitalWrite(), digitalRead() and analogRead() functions. 6 analog input channels are from pins AO to A5 and provide 10-bit resolution. The board can be powered either from using USB cable which operates at 5 volts or by DC jack which operates between 7 to 20 volts.

There is an onboard voltage regulator to generate 3.3 volts for operating low powered devices. Since the ATmega328 work on USART, SPI and 12C communication protocol, has 0 (RX) and 1(Tx) pins for USART communication, SDA (A4) and SCL (A5) pin for 12C and SS (10), MOSI (11), MISO (12) and SCK (13) pins for SPI communication protocol. These specifications make Arduino Uno board perfect for Home Automation project.

4.1.1 PIN CONFIGURATION

Fig. 4.1 Arduino NANO

The Nano has 8 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the analogReference() function. Analog pins 6 and 7 cannot be used as digital pins. Additionally, some pins have specialized functionality:

- I2C: A4 (SDA) and A5 (SCL). Support I2C (TWI) communication using the Wire library (documentation on the Wiring website).

There are a couple of other pins on the board:

- AREF. Reference voltage for the analog inputs. Used with analogReference().
- Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Vin: This is the input voltage pin of the Arduino board used to provide input supply from an external power source.

5V: This pin of the Arduino board is used as a regulated power supply voltage and it is used to give supply to the board as well as onboard components.

3.4V: This pin of the board is used to provide a supply of 3.3V which is generated from a voltage regulator on the board

GND: This pin of the board is used to ground the Arduino board.

Reset: This pin of the board is used to reset the microcontroller. It is used to Resets the microcontroller.

Analog Pins: The pins A0 to A5 are used as an analog input and it is in the range of 0-5V.

Digital Pins: The pins 0 to 13 are used as a digital input or output for the Arduino board.

Serial Pins: These pins are also known as a UART pin. It is used for communication between the Arduino board and a computer or other devices. The transmitter pin number 1 and receiver pin number 0 is used to transmit and receive the data resp.

External Interrupt Pins: This pin of the Arduino board is used to produce the External interrupt and it is done by pin numbers 2 and 3.

PWM Pins: This pin of the board is used to convert the digital signal into an analog by varying the width of the Pulse. The pin numbers 3,5,6,9,10 and 11 are used as a PWM pin.

SPI Pins: This is the Serial Peripheral Interface pin, it is used to maintain SPI communication with the help of the SPI library. SPI pins include:

SS: Pin number 10 is used as a Slave Select

MOSI: Pin number 11 is used as a Master Out Slave In

MISO: Pin number 12 is used as a Master In Slave Out

SCK: Pin number 13 is used as a Serial Clock

LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when the digital pin becomes high.

AREF Pin: This is an analog reference pin of the Arduino board. It is used to provide a reference voltage from an external power supply.

4.2 NodeMCU

NodeMCU is an open-source LUA based firmware developed for the ESP8266 wifi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e. NodeMCU Development board.Since NodeMCU is an open-source platform, its hardware design is open for edit/modify/build. NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer to the ESP8266 WiFi Module. There is Version2 (V2) available for NodeMCU Dev Kit i.e. NodeMCU Development Board v1.0 (Version2), which usually comes in black colored PCB.For more information about NodeMCU Boards available in the market refer to NodeMCU Development Boards NodeMCU Dev Kit has Arduino like Analog (i.e. A0) and Digital (D0-D8) pins on its board. It supports serial communication protocols i.e. UART, SPI, I2C, etc. Using such serial protocols we can connect it with serial devices like I2C enabled LCD display, Magnetometer HMC5883, MPU-6050 Gyro meter + Accelerometer, RTC chips, GPS modules, touch screen displays, SD cards, etc

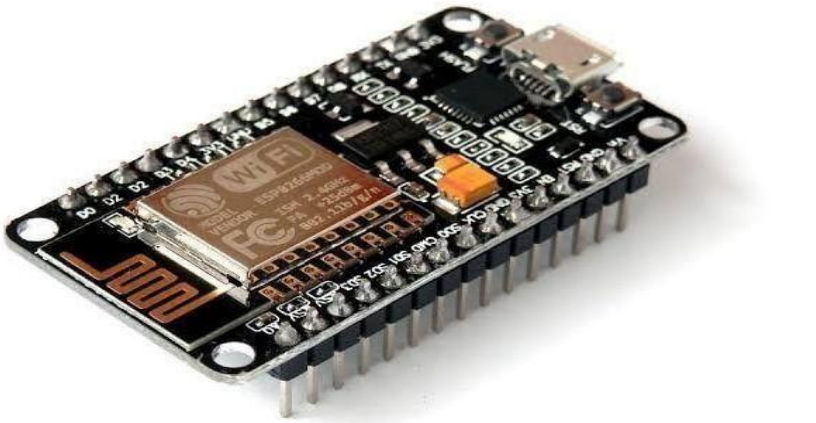

Fig.4.2 NodeMCU

As Arduino.cc began developing new MCU boards based on non-AVR processors like the ARM/SAM MCU used in the Arduino Due, they needed to modify the Arduino IDE so it would be relatively easy to change the IDE to support alternate toolchains to allow Arduino C/C++ to be compiled for these new processors. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language. Some ESP8266 enthusiasts developed an Arduino core for the ESP8266 WiFi SoC, popularly called the "ESP8266 Core for the Arduino IDE".[18] This has become a leading software development platform for the various ESP8266-based modules and development boards, including NodeMCUs.

Pin function:

Pin numbers in the Arduino IDE correspond directly to the ESP8266 GPIO pin numbers. pinMode, digitalRead, and digitalWrite functions work as usual, so to read GPIO2, call digitalRead(2) or its alias name digitalRead(D10). At startup, pins are configured as INPUT. Digital pins 0—15 can be INPUT, OUTPUT, or INPUT_PULLUP. Pin 16 can be INPUT, OUTPUT or INPUT_PULLDOWN_16 and is connected to the build-in LED. It can be addressed with digitalRead(D0), digitalRead(16) or digitalRead(LED_BUILDIN). Pins may also serve other functions, like Serial, I2C, SPI. These functions are normally activated by the corresponding library. The diagram above shows the pin mapping for the popular ESP8266 NodeMcu module. Pin interrupts are supported through attachInterrupt, functions. Interrupts may be attached to any GPIO pin, except GPIO16. Standard Arduino interrupt types are supported: CHANGE, RISING, FALLING.

pin configuration:

Pin Category	**Name**	**Discription**
Power	Micro-USB	NodeMCU can be powered through the USB port
	3.3v	Regulated 3.3V can be supplied to this pin to power the board
	vin	External Power Supply
	GND	ground
Control Pins	EN, RST	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog

		voltage in the range of 0-3.3V
GPIO Pins	GPIO1 to GPIO16	NodeMCU has 16 general purpose input-output pins on its board
SPI Pins	SD1, CMD, SD0, CLK	NodeMCU has four pins available for SPI communication.
UART Pins	TXD0, RXD0, TXD2, RXD2	NodeMCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program
I2C Pins		NodeMCU has I2C functionality support but due to the internal functionality of these pins, you have to find which pin is I2C.

4.2 Motion Sensor

Motion sensors are devices that detect movement in their surrounding environment. They are commonly used in various applications such as security systems, automatic lighting, and home automation. Motion sensors work by detecting changes in infrared radiation, microwaves, or sound waves caused by moving objects.

There are several types of motion sensors:

Passive Infrared (PIR) Sensors: These sensors detect changes in infrared radiation emitted by objects in their field of view. When a warm body moves within the sensor's range, it triggers an alarm or activates a device.

2. **Microwave Sensors:** Microwave sensors emit microwave pulses and measure the reflections off nearby objects. They are particularly useful for detecting motion through walls or other obstructions.

3. **Ultrasonic Sensors:** Ultrasonic sensors emit high-frequency sound waves and measure the reflections off nearby objects. They are commonly used in automatic door openers and occupancy detection systems.

4. **Dual Technology Sensors:** These sensors combine two different technologies, such as PIR and microwave, to reduce false alarms and improve detection accuracy.

5. **Motion sensors** play a crucial role in enhancing security, saving energy, and automating various tasks in both residential and commercial settings. They are often integrated into smart home systems, allowing users to monitor and control their properties remotely.

4.2.1 Passive Infrared (PIR) Sensor:

All warm blooded animals produce IR radiation. Passive infrared sensors include a thin Pyroelectric film material, that responds to IR radiation by emitting electricity. This sensor will activate burglar alarm whenever this influx of electricity takes place. These sensors are economical, don't use more energy and last forever. These sensors are commonly used in indoor alarms.

Fig.4.3 Passive Infrared Sensor

Passive Infrared (PIR) sensors are one of the most commonly used types of motion sensors. They work by detecting changes in infrared radiation with their field of view. Here's how they function and some key aspects of their operation:

Detection Principle: PIR sensors operate based on the principle that all objects with a temperature above absolute zero emit infrared radiation. When a warm object moves within the sensor's detection range, it causes a change in the infrared radiation pattern detected by the sensor.

Sensor Design: PIR sensors typically consist of a pyroelectric sensor, which is a crystal that generates a voltage when exposed to infrared radiation, and a specially designed lens that focuses infrared energy onto the sensor. The lens segments thesensor's field of view into multiple zones, allowing the sensor to detect motion acrossdifferent areas.

Two Sensing Elements: Many PIR sensors have two sensing elements arranged in a symmetrical fashion to detect changes in temperature. When a warm object moves across the sensor's field of view, it causes a temperature differential between the twoelements, resulting in a change in voltage output.

Signal Processing: The voltage output from the sensor is processed by an onboard circuitry or microcontroller to determine whether motion has been detected. This processing includes amplification, filtering, and thresholding to distinguish betweenmotion and background noise.

Detection Range and Coverage: PIR sensors have a detection range and angle of coverage, which can vary depending on the sensor's design and application. The detection range is typically adjustable, allowing users to customize the sensor sensitivity according to their needs.

CHAPTER 5

HARWARE DESIGN

The block diagram of an intruder alert system using IoT and NodeMCU with Isensor and Telegram bot consists of the following components:

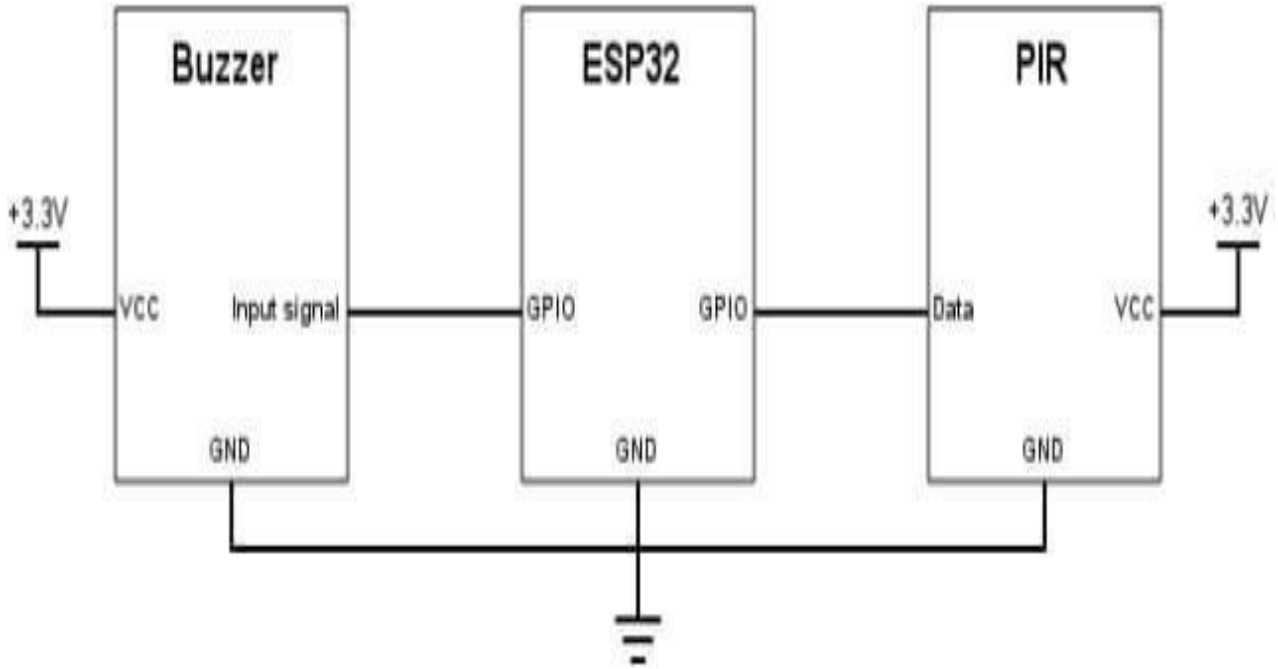

Fig 5.1 Concept design

NodeMCU Device: The NodeMCU device acts as a central processing unit for the system. It receives data from the sensors and processes it to determine if an intrusion has occurred. The NodeMCU device is connected to the internet via WiFi.

Telegram Bot: The Telegram bot is integrated into the system and receives messages from the NodeMCU device. It sends notifications to the homeowner's mobile phone or desktop in case of any intrusions.

Homeowner's Mobile Phone or Desktop: The homeowner's mobile phone or desktop receives real-time alerts and notifications from the Telegram bot. The homeowner can also use their mobile phone or desktop to monitor and control the system remotely.

The working of the system is as follows:

- The sensors detect any movements or changes in temperature within the home.
- The data from the sensors is transmitted to the NodeMCU device via Wi-Fi.
- The NodeMCU device processes the data and determines if an intrusion has occurred.
- If an intrusion is detected, the NodeMCU device sends a message to the Telegram bot.
- The Telegram bot receives the message and sends a notification to the homeowner's mobile phone or desktop.
- The homeowner receives the notification and can take appropriate action to secure their home.
- The homeowner can also monitor and control the system remotely using their mobile phone or desktop.

In summary, the block diagram of an intruder alert system using IoT and NodeMCU with sensor and Telegram bot shows the different components of the system and how they work together to provide a secure and convenient solution for homeowners. The use of sensors and Telegram bot integration adds an extra layer of security and convenience to the system, making it an ideal solution for modern-day home security needs.

CIRCUIT DIAGRAM

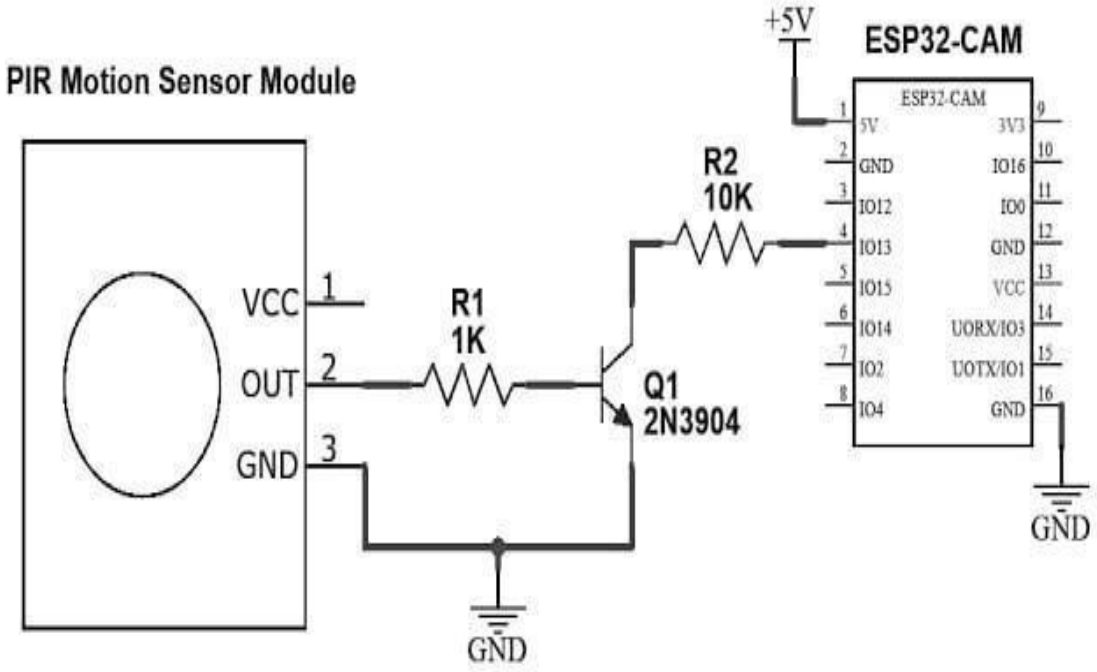

Fig.5.2 Circuit Diagram for intruder alert system

5.1 WORKING PRINCIPLE

Data Transmission: When the IR sensors detect any movement, the data is transmitted to the NodeMCU device via Wi-Fi.

Data Processing: The NodeMCU device processes the data received from the IR sensors and determines if there is an intrusion or not. If an intrusion is detected, the NodeMCU device sends a message to the Telegram bot.

Telegram Bot Integration: The Telegram bot is integrated into the system, and

it receives the message from the NodeMCU device. The Telegram bot sends a notification to the homeowner's mobile phone or desktop.

Alert Notification: The homeowner receives a real-time alert on their mobile phone or desktop, indicating that an intrusion has been detected. They can then take appropriate action to secure their home.

Remote Monitoring and Control: The Telegram bot integration allows the homeowner to monitor and control the system remotely. The homeowner can receive updates on the system's status and can also arm or disarm the system from their mobile phone or desktop.

RTL Inverter Logic: This logic is implemented here because if an intruder happens to break the window glass of the house, the continuity in the wire breaks and the off state is indicated by the inverted logic and is fed further into the following decision-making blocks.

RTL AND logic: This block receive two inputs; one is from the RTL inverter logic block and the other one is the indication from the nodeMCU triggered by the IR Sensor. If either one block id triggered by an intruder, the indication is passed to the following relay block.

CHAPTER 6
SOFTWARE MODULE

6.1 SOURCE CODE

```
#include <ESP8266WiFi.h>
#include <WiFiClientSecure.h>
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>

// Replace with your network credentials
const char* ssid = "vivo";
const char* password = "12345678";

// Initialize Telegram BOT
#define BOTtoken "7087557020:AAEjsU6XmBIt839x3mct8UQSqKDg8trE_68"
//your Bot Token (Get from Botfather)

// Use @myidbot to find out the chat ID of an individual or a group
// Also note that you need to click "start" on a bot before it can
// message you
#define CHAT_ID "1027566408"

X509List cert(TELEGRAM_CERTIFICATE_ROOT);
WiFiClientSecure client;
UniversalTelegramBot bot(BOTtoken, client);

const int motionSensor = 14; // PIR Motion Sensor
bool motionDetected = true;
```

```
// Indicates when motion is detected
void ICACHE_RAM_ATTR detectsMovement() {
  //Serial.println("MOTION DETECTED!!!");
  motionDetected = false;
}

void setup()
  { Serial.begin(115200);
  configTime(0, 0, "pool.ntp.org");      // get UTC time via NTP
  client.setTrustAnchors(&cert); // Add root certificate for api.telegram.org

  // PIR Motion Sensor mode INPUT_PULLUP
  pinMode(motionSensor, INPUT_PULLUP);
  // Set motionSensor pin as interrupt, assign interrupt function and set RISING
mode
  attachInterrupt(digitalPinToInterrupt(motionSensor), detectsMovement, RISING);

  // Attempt to connect to Wifi network:
  Serial.print("Connecting Wifi: ");
  Serial.println(ssid);

  WiFi.mode(WIFI_STA);
  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED)
    {Serial.print(".");
    delay(500);
  }
```

```
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.print("IP address: ");
  Serial.println(WiFi.localIP());

  bot.sendMessage(CHAT_ID, "Bot started up", "");
}

void loop()
  { if(motionDetected==false){ bot.sendMessage(CHAT
    _ID, "Motion detected!!", "");Serial.println("Motion
    Detected");
    motionDetected = true;
  }
}
```

CHAPTER 7

RESULT AND CONCLUSION

7.1 RESULT

Intruder Alert detector projects have show promising results in terms of convenience, cost-effectiveness, and scalaility. Overall, Intruder Alert detector have the potential to offer a number of benfits to consumers

.

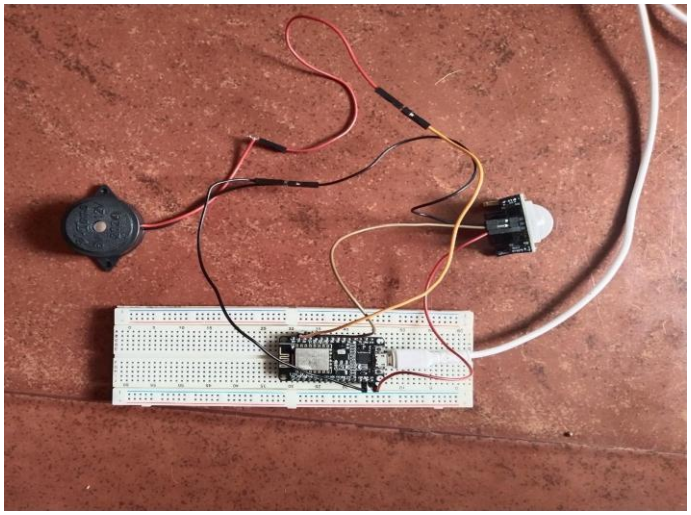

Fig. 7.1 Hardware Output

7.2 CONCLUSION

In conclusion, the intruder alert system using IoT and NodeMCU with PIR sensorand Telegram bot is an innovative and reliable solution for modern-day home security needs. The system is designed to detect any movements or changes in temperature within the home, providing homeowners with a real-time alert in case of any intrusions. The use of IoT and NodeMCU technology allows for wireless communication between the various components of the system, makingit easy to install and configure. The integration of PIR sensors and Telegram bot provides an added layer of security and convenience to the system, allowing homeowners to monitor and control the system remotely from anywhere in the world. Overall, the intruder alert system using IoT and NodeMCU with PIR sensor and Telegram bot is an efficient, reliable, and cost-effective solution for homeowners looking to secure their homes against intrusions and burglaries.

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