INTRODUCTION TO ELECTRICAL ENGINEERING [19AIE104]

S1 B. TECH CSE (AIE)

**SMART HOME SYSTEM**

A Project Report

*Submitted b*y

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**ABSTRACT**

Project is based on smart home. It uses various sensors to identify what going around its surrounding and change or give alerts to the user according to it. Using an LED screen, the output from each sensor is displayed. A photoresistor is used to turn on/off the light accordingly, A gas sensor to detect the leakage of gas, A supersonic meter to identify whether a pers’t, on is coming or not, A PIR sensor to find whether someone is present inside the room or not.

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**INTRODUCTION**

Smart Home is collaboration of technology and services through a network for better quality living. A smart home allows the entire home to be automated and therefore provide ease and convenience to everyday activities in the home. This technology is used to make all electronic devices to act ‘smart’. Soon almost all the electronic devices will take advantage of this technology through home networks and the internet. Many people think this technology as pure networking. Others think this technology will reduce their workload, but smart home technology is combination of both and much more. Smart home technology is currently being implemented for entire house in particularly kitchen and living room. Basically, smart home facilitates users with security, comfortable living and energy management features as well as added benefits for disabled individuals.

The research standards have already anticipated a smart, connected home where multiple devices cooperate to pamper to users wishes with little or no effort. For example, in a home with remotely controllable lights, cameras and locks, it should be easy to automatically alter lights based on the weather and time of day as well as remotely view who is at the door before unlocking it. But such straight forward home-wide tasks are remarkably unavailable from the mainstream even though the needed hardware devices are reasonably priced.

Components required

1. Arduino Uno R3 - 1
2. LCD 16 x 2 - 1
3. 1kΩ Resistor - 3
4. 220Ω Resistor - 1
5. Ultrasonic Distance Sensor - 1
6. 33.684, -434.259, -234.501 PIR Sensor - 1
7. Gas Sensor - 1
8. Photoresistor - 1
9. Relay SPDT - 1
10. Light Bulb - 1
11. DC Motor - 1
12. 5, 5 Power Supply - 1
13. Slideswitch - 1

Circuit Diagram

Diagram, schematic

Description automatically generated

Graphical user interface, application

Description automatically generated with medium confidence

WORKING OF THE SYSTEM

1. Arduino – The Arduino board is connected to a computer via USB, where it connects with the Arduino development environment (IDE). The user writes the Arduino code in IDE, then uploads it to the microcontroller which executes the code, interacting with inputs and outputs such as sensors, motors, and lights.
2. Ultrasonic Distance Sensor – Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.
3. PIR Sensor – Passive infrared (PIR) sensors use a pair of pyroelectric sensors to detect heat energy in the surrounding environment. These two sensors sit beside each other, and when the signal differential between the two sensors changes, the sensor will engage.
4. Gas Sensor – Gas detectors use a sensor to measure the concentration of gases in the atmosphere. The sensor serves as a reference point and scale, producing a measurable electric current when a chemical reaction caused by a specific gas occurs.
5. Photoresistor – When light is incident on the photoresistor, photons get absorbed by the semiconductor material. The energy from the photon gets absorbed by the electrons. When these electrons acquire sufficient energy to break the bond, they jump into the conduction band.

A screenshot of a computer

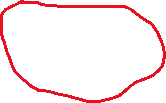
Description automatically generated with medium confidence



The components present in the system is fully controlled by Arduino UNO R3.A LCD (16x2) display used for displaying the outputs from sensors.

Graphical user interface, diagram, application

Description automatically generated



The current state of the led bulb, gas level, and distance of an object is displayed in the LED display.

Graphical user interface, diagram, application

Description automatically generated



A PIR sensor is used to find out whether a person is present in a room or not,

if a person is present then the light and fan in the room is automatically turned on.

Graphical user interface, diagram, application

Description automatically generated



A gas sensor is used which alerts the house owner by displaying the danger well in the LCD screen from low to Exit.

Graphical user interface, diagram, application

Description automatically generated



A ultrsonic distance sensor is used to know the distance of a incoming person which is also displayed in the LCD display.

Graphical user interface, diagram, application

Description automatically generated



A photoresistor is used to turn the light on/off according to the light intensity and switch is placed to manually shut down the fan manually.

RESULT

When the system is activated, LCD displays messages according to the output from sensors and the light and fan is also turned on/off by the sensors outputs.

CONCLUSION

By using this home automation model, a normal house can be changed to a futuristic level. It can reduce the energy consumption, manual labour etc.

Also, there will be a less chance for any short circuits.

APPENDIX

// include the library code:

#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

//For ultrasound sensor

int distanceThreshold = 0;

int cm = 0;

int inches = 0;

//for Relay Control

int releNO = 13;

int inputPir = 8;

int val = 0;

int resuldoSensorLDR;

int sensorLDR = A0;

//For Gas sensor

int const PINO\_SGAS = A1;

long readUltrasonicDistance(int triggerPin, int echoPin)

{

pinMode(triggerPin, OUTPUT); // Clear the trigger

digitalWrite(triggerPin, LOW);

delayMicroseconds(2);

// Sets the trigger pin to HIGH state for 10 microseconds

digitalWrite(triggerPin, HIGH);

delayMicroseconds(10);

digitalWrite(triggerPin, LOW);

pinMode(echoPin, INPUT);

// Reads the echo pin, and returns the sound wave travel time in microseconds

return pulseIn(echoPin, HIGH);

}

void setup() {

// set up the LCD's number of columns and rows:

lcd.begin(16, 2);

pinMode(releNO, OUTPUT);

pinMode(inputPir, INPUT);

pinMode(sensorLDR, INPUT);

Serial.begin(9600);

}

void loop() {

// set threshold distance to activate LEDs

distanceThreshold = 350;

// measure the ping time in cm

cm = 0.01723 \* readUltrasonicDistance(7, 6);

// convert to inches by dividing by 2.54

inches = (cm / 2.54);

lcd.setCursor(0,0); // Sets the location at which subsequent text written to the LCD will be displayed

lcd.print("D:"); // Prints string "Distance" on the LCD

lcd.print(cm); // Prints the distance value from the sensor

lcd.print(“cm”);

delay(10);

val = digitalRead(inputPir);

resuldoSensorLDR = analogRead(sensorLDR);

if(resuldoSensorLDR<600)

{

if(val == HIGH)

{

digitalWrite(releNO, HIGH);

lcd.setCursor(0,1);

lcd.print(“L: On” );

delay(5000);

}

else{

digitalWrite(releNO, LOW);lcd.setCursor(0,1);

lcd.print(“L: Off”);

delay(300);

}

}

else{ digitalWrite (releNO, LOW);

Serial.println(resuldoSensorLDR);

delay(500);

}

int color = analogRead(PINO\_SGAS);

lcd.setCursor(8,0);

//lcd.print ("");

if(color <= 85){

lcd.print(“G: Low”);

} else if(color <= 120){

lcd.print(“G: Med”);

} else if(color <= 200){

lcd.print(“G: High”);

} else if(color <= 300){

lcd.print(“G: Ext”);

}

delay(250);

}

REFERENCES

<https://www.tinkercad.com/>

[YouTube](https://www.youtube.com/)

[The Introduction To Smart Home Technologies Information Technology Essay (uniassignment.com)](https://www.uniassignment.com/essay-samples/information-technology/the-introduction-to-smart-home-technologies-information-technology-essay.php)

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