Room Automation using Arduino Uno and Electronic Sensors

Prakhar Srivastava[1], Kunal lala[2], Sandeep Bhatia[3], Mayank Rao[4], Md Shariq[5], Prashant Phulera[6]

UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India[1]

Assistant Professor, Dept. of ECE, Raj Kumar Goel Institute of technology, Ghaziabad, Uttar Pradesh,India[2]

Assistant Professor, Dept. of ECE, Raj Kumar Goel Institute of technology, Ghaziabad, Uttar Pradesh,India[3]

UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India[4]

UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India5

UG Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, India[6]

ABSTRACT: In today's world there is a constant need for automatic appliances due to upscale in the standards of people living in the society. There is a sense of requirement for designing circuits that would ease the complexity of life, after looking at such concerns of the society we had built the project which when successfully connected, in living area has the ability to count no of visitor present inside the room and the live counting will be displayed on the LCD screen. and when the room is empty all the appliances such as fan, lights etc which are not necessary will be turned off automatically, by our system. In order to stop unnecessary wastage of energy in daily life, along with this we have also added temperature, humidity and gas sensor. After looking at the mandatory security concerns in the houses. These sensors will actively monitor the temperature and humidity area in which it is applied we have added a security feature with the help of gas sensor which will be monitoring any gas leaks in the area it is applied. And will trigger the alarm when it records any leaks. This safety features can alert the people in the earliest time possible and can save many lives.

KEYWORDS: Gas Sensor, Temperature Sensor,Arduino Uno

I.INTRODUCTION

The Main objective of the Project is to make a controller-based model to count numbers of persons entering in the room and according light up the room we can achieve this with the help of sensor and can know the exactnumber of persons.
In today's world. There is a continuous worry about the unnecessary wastages of energy ,our approach is to avoidenergy wastageby the help of home automation.
This project "Automatic Room Light Controller with Visitor Counter and Temperature Gas and Humidity Sensor" is most definitive circuit that faces over the function of controlling the room lights as well as counting no of persons ,inthe room actively. When somebody enters the room then the counter is incremented by one and the light in the roomwill be turned ON and when on leaves the room the counter is decremented by one the light the light will only beswitched OFF until all the person in the room go out .Screen also displays the no of person present the room .We alsousing different sensor to measure different parameters such as temperature as well as humidity of the room.With thehelp of DTH 11which actively sense the reading and then display it on the LCD actively.It is always important to look after a safety features of the house and therefore we have also assembled gas sensors in one circuit which will sense any leakage of combustible or any volatile gas and alert the residents by Raising an alarm whenever the sensor senses any leakage of gas. In this way this security features are very helpful and can save manylives by alerting people in available time.After above functioning the tracking of visitors and counting is displayed on the display . When the counter turns to zero all the light is turned OFF with such features people can save energy and save the world . We can also track temperature , Humidity as well as sense for any volatile gas leakage and alert the people and save lives.

II.HARDWARE REQUIREMENT

There are various numbers of Hardware are used in Automatic Room Light Controller with visitor Counter along with Gas, Temperature & Humidity sensor. mainly this consists of the following different functional blocks.
1. Infrared Sensor
2. Arduino Uno
3. LCD Display
4. Gas Sensor

5. DHT-11 Sensor
6. Relay

I.INFRARED SENSOR: An infrared sensor is an electronic instrument that is utilized to detect certain qualities of its environmental factors. The sensor checks the quantity of people inside the room.This sensor counts the no of persons vising in the room.This sensor is placed in entry and exit door.This sensor observes the interruption and gives an input to the Arduino Uno which counts increment or decrement depending on entering or exiting of person
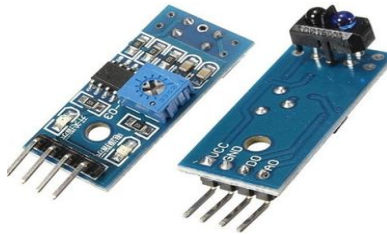
II.ARDUINO UNO: It is a microcontroller board based on ATmega328. It has 20 input/output pins (of which 6 can be used as PWM outputs and 6 can be used as inputs), a 16 MHz resonator, a power jack, a USB connection,an in-circuit system programming (ICSP) header, and a reset button. It contains everything needed to support the microcontroller.

III.LCD DISPLAY: LCD (Liquid Crystal Display) is a type of flat panel display which uses the light-modulating properties of liquid crystals combined with polarizers We have used 16X2 LCD display to display the number of visitors, Temperature and humidity reading inside the room.

IV.GAS SENSOR:A gas sensor is a device which detects the presence of gases in the atmosphere. Based on it the gas the sensor produces a corresponding potential difference by changing resistance of material inside the sensor. We have used Gas sensor to detect the presence of harmful gas inside room.

V.DHT 11: DHT11 is one of the basic, digital temperature and humidity sensor. It has capacitive humidity sensor and a thermistor to measure the surrounding air. Its, fairly simple to use. The only downside of this sensor is you can only get new data from it once every 2 seconds. We have used this sensor to detect Humidity and Temperature level and display

on LCD.

VI.RELAY: A Relay is an electronically operated switch.It consists of a set of number of input terminals for a single and multiple control signals.Relay is used where it is necessary to controls a circuit by an independent low-powered signal.When input of the relay is high the coil is magnetized to switched the NO pin.


III.SOFTWARE REQUIREMENT

In order to operate the project we have to do coding and that can be made possible with the help of some software

I.ARDUINO IDE (INTREGATED DEVELOPMENT ENVIRONMENT): Arduino IDE is used to write and upload the program to different Arduino ports.Arduino Integrated Development is one of the cross-platform Application that allows to write and upload program in C and C++ language.

II.KEIL COMPILER: Keil compiler 8051 development tool is required to save the Complex problem faced during embedded software designing.

IV.WORKING
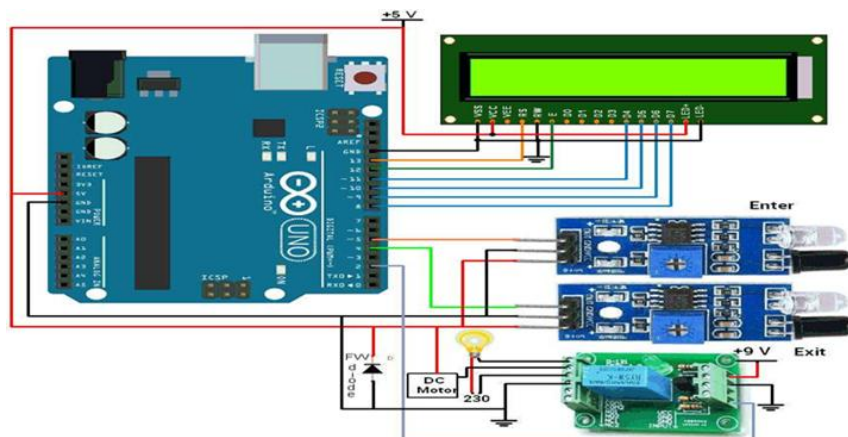
The Automatic Room Lights Controller with Visitor Counter along with Temperature, Humidity & Gas Sensor is a simple project, where the lights in the room will automatically turn on upon detecting an object (Human) and stay turned on until the person has left orthere is no motion.Working of this project is very simple and explained belowInitially, when there is no human movement, the IR Sensor doesn't detect any person and its OUT pin stays LOW. As the person enters the room, the change in infrared radiation in the room is detected by the IR SensorAs a result, the output of the IR Sensor becomes HIGH. Since the Data out of the IR Sensor is connected to Digital Pin 8 of Arduino, whenever it becomes HIGH, Arduino will activate the relay by making the relay pin LOW (Because the relay module is the active LOW module).This will turnON the Light. Light remains turned ON as long as there is movement in front of the sensor.If the person takes a nap or leaves the room, the IR Radiation will become stable (there will be no change) and hence, the Data OUT of the IR Sensor will become LOW. This process will make the Arduino to turn OFF the relay (make the relay pin HIGH) and the room light will be turned OFF. The working of the gas sensor is to detect the presence of the gases present inside the room and DHT 11 sensor detects the temperature and humidity level inside the room and then display the temperature and humidity on the LCD Screen.

V.ADVANTAGES

1. The main advantage of this project is that it helps in energy conservation as when there will be nobody inside the room then lights are automatically turned off.
2. Human efforts to count the number of persons are eliminated because it does the automatic person counting with the help of two IR sensors installed on the entering and exiting door.

VI.RESULT

Finally after testing the project module and we came with the result for testing automatic light control with visitor counter along with humidity, temperature and gas detector that it automatically counts the number of persons in the room and also it determines the temperature, humidity level and gas leakage detection.
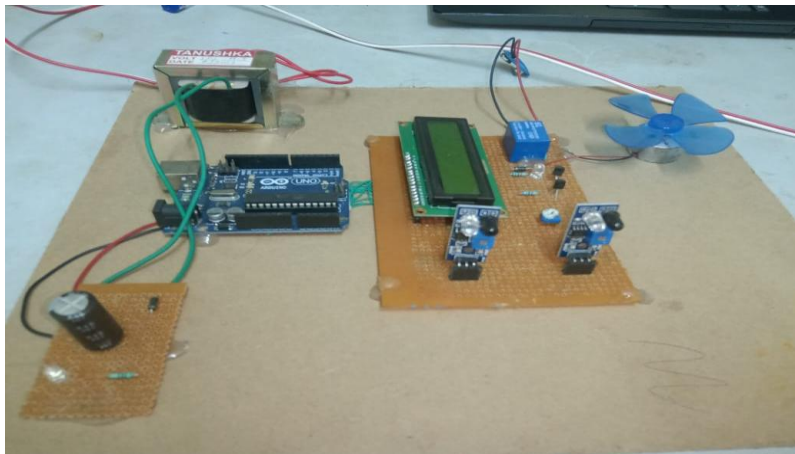
VII.CONCLUSION

We can conclude following points from the above Implementation

- We can count number of visitors inside the room at a time and system automatically turns OFF and ON as per the condition.
- Temperature and Humidity sensor will actively sense the temperature as well as humidity inside the room.
- Gas Sensor will detect for any harmful gas leak in the room and it will alert in case of any leakage in the room.

VIII.FUTURE SCOPE

- By using this circuit and proper power supply we can implement various application such as fans, air conditioner etc.
- By modifying the circuit and using two relay we can achieve a task of opening and closing the door

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