



Priya H. Pande¹, Nileshwari N. Solanke², Mandar H. Polade³, Prof.Pragati D. Pawar⁴

¹U. G. Student, Department of EXTC Engineering, J.D.I.E.T., Yavatmal, Maharashtra, India, priyapande2605@gmail.com

²U. G. Student, Department of EXTC Engineering, J.D.I.E.T., Yavatmal, Maharashtra, India, nileshwarisolanke@gmail.com

³U. G. Student, Department of EXTC Engineering, J.D.I.E.T., Yavatmal, Maharashtra, India, mandarpolade.1212@gmail.com

⁴Assistant Professor, Department of EXTC Engineering, J.D.I.E.T., Yavatmal, Maharashtra, India, pawar_pragati16@rediffmail.com

Abstract

Electricity is one of the most important resources in this century. We should conserve the electricity. But many times we come outside the room and forget to turn off the lights thus the electricity is wasted. To overcome this we are going to implement this project. The project 'Automatic room light controller using Microcontroller Atmega16 And IR sensors' controls a room light as well as count the number of individuals entering and leaving the room. One more feature is that, it counts the total number of individuals present inside a room and displayed it on the seven segment display. Microcontroller and IR sensor does this job mainly. IR sensors senses the obstruction and microcontroller receives the signals produced by the obstruction from the sensors. The received signal is operated via program stored in ROM of microcontroller. Microcontroller continuously monitors the infrared receiver. When any object pass-through the IR receiver's then the rays falling on the receiver is obstructed. This obstruction is sense by the Microcontroller.

Index Term: Microcontroller ATmega16, IR Sensors, Seven Segment Display, etc.

1. INTRODUCTION

In this digital world we need every possible thing around us to be automatic which reduces human efforts. There are increasing electronic circuits that make today's life easier and simple. Nowadays Energy disaster is the big problem faced by everyone. So there is a need to conserve energy. This project is very useful for such problems as one generally forgets to turn off lights while leaving the room. The aim of this is to make an automatic controller based prototype to count the number of individuals entering in the particular room and accordingly light up the room. This project has two parts. First part is "Individual count" and other one is "Automatic room light controller". We use IR sensors to detect number of individuals and display the count on the seven segment display to avoid congestion. This project is very advantageous in schools and colleges for their auditorium. "AUTOMATIC ROOM LIGHT CONTROLLER USING MICROCONTROLLER AND IR SENSORS" as the name specifies that it controls the task of counting the number of individual and light up

room with accuracy. When an individual's enters into a room then one counter is incremented by one and light in the room will be switched ON and when an individual leaves the room then counter is decremented by one and light in room will be switched OFF.

2. LITERATURE SURVEY

Y.Vivekananth, R.Kalpna, G.Malarvizhi, P.Mounika, S.Muniyappan, Presented Bidirectional Visitor Counter Using

IoT [1]. They developed a system of Automatic room light and fancontroller using Arduino and intensity of light can be controlled according to the intensity of room also this device is use when fire accident may occur it gives alarm and automatically blows up water into the fired place and using IOT they can send information of fire detection to the customer phone number.

E.Shilpa, BushraBegum, Sara Sultana, Ali Mohsin Mohammad, Mohammed Kashifuddin, Presented Implementation of Automatic Room Light Controller with Visitor Counter Design using 8051 Microcontroller

[2]. In this project they uses the 8051 Microcontroller and visitor counter for implementation. Here they provided us information about which software and algorithm they have used for the development of project which is very helpful in the schools colleges, it count up to 999 person.

FaizanArif Khan, PrabhatRanjan Sarkar, Saima Rahman, Fatima Yasmeen, Presented ZigBee Sensor Based Automatic Room Light Controller with Visitor Counter [3]. In this paper they used the 8951 Microcontroller and IR sensors for the development of project. The working of this project is whenever individual enter in a room the light and fan gets start and counter will count the number of person enter in the room upto 255 count. Here ZigBee sensors turns on the power outlet and dims the light.

Alex Joy¹, Athul S. Thoppil², Basil P. Alias³, Lekshmy S. Kurup⁴, Rini Varghese Presented Microcontroller Based Room Automation [4]. They design a system of room automation using Arduino, It is a mechanism to improve not only energy consumption but also a comfortable living can be achieved by this technique also they concluded that by using internet services more development can be done.

2. BLOCK DIAGRAM

The block diagram of the “Automatic room light controller using Microcontroller Atmega16& IR Sensors” is shown in figure. It consists of following components.

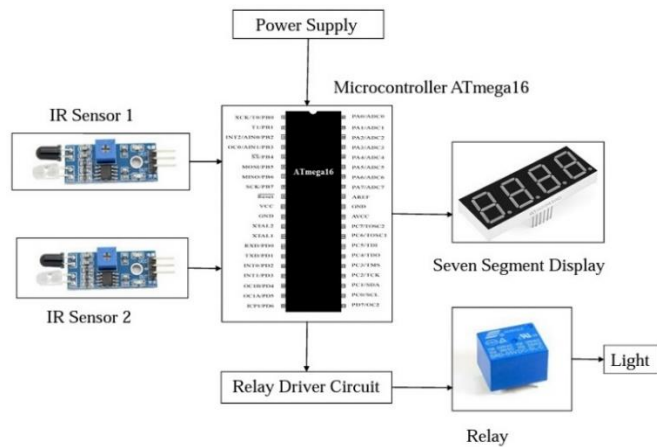
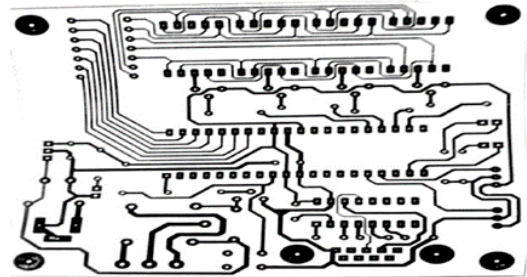
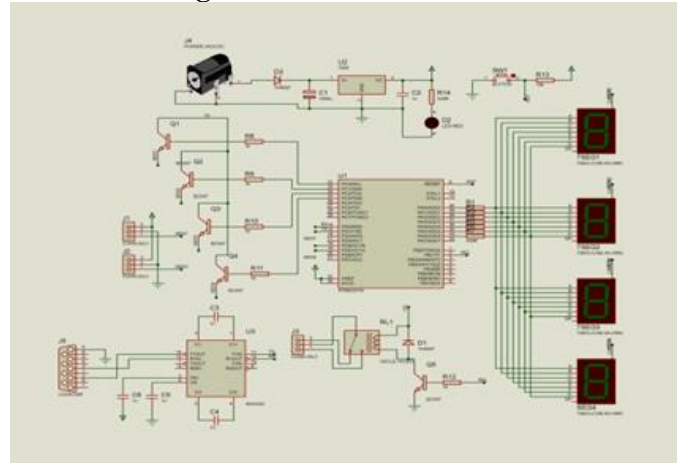


Fig-1: Block diagram

2.2 Circuit Layout



2.3 Circuit Diagram



3. HARDWARE USED

- 3.1 Microcontroller ATmega16
- 3.2 IR Sensor
- 3.3 Relay
- 3.4 MAX232 IC
- 3.5 7805 IC (Voltage Regulator)
- 3.6 BC547
- 3.7 1N4007 (Diode)
- 3.8 LM358
- 3.9 Seven segment display
- 3.10 Light Emitting Diode (LED)
- 3.11 Capacitor
- 3.12 Resistor

3.1 MICROCONTROLLER ATmega16

This is an 8 bit high performance microcontroller of Atmel’s mega AVR family with low power consumption. ATmega16 Microcontroller is based on enhanced RISC (Reduced instruction set computing) Architecture having 131 powerful instructions. It works on a maximum frequency of 16 MHz ATmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEROM of 512 bytes. ATmega16 is a 40 pin microcontroller. There are total 32 I/O (Input/output) lines which are divided into four 8 bit ports designated as PORTA, PORTB, PORTC and PORTD.

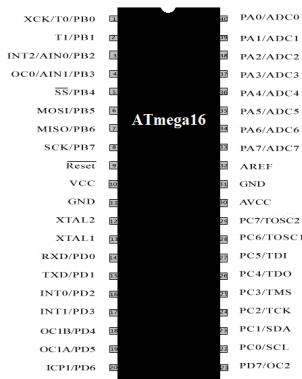


Fig-2: Microcontroller ATmega16

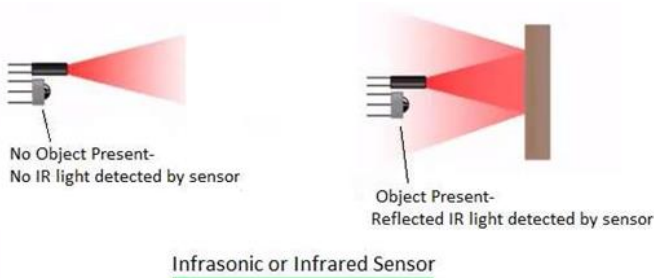
3.2 IR Sensor

IR sensor (Infrared sensor) is an electronic device that emits in order to sense some aspects of the surrounding. IR sensors are used to produce IR waves. In this project there are two IR sensors. IR sensors consist of IR transmitter and IR receiver. IR1 detects the number of individuals entering a room. IR2 detects number of individuals leaving the room. Depending upon the cost of frequency range of IR sensors get varies.



Fig-3: IR Sensor

3.2.1 Principle of operation



3.3 Relay

A Relay is in electromagnetic switch operated by a relatively small electric current that can turn ON or OFF a much larger electric current. The heart of a relay is an electromagnet (A coil of wire that becomes a temporary magnet when electricity flows through it). We are using 12v dc relay. As microcontroller cannot drive relay

directly so output signal from microcontroller is passed to the base of transistor (BC547), which activates the relay so it can operate the device. Relay can control the charge flowing through the load (i.e. light).



Fig-4: Relay

4. SOFTWARE USED

1. Embedded C.
2. Proteus(Processor for text East to use):
It is Software used for simulation and designing PCB layout. It was created by Simone Zanella in 1998. It is fully functional and procedural. It consists of many functions and languages.
3. Flash Magic
It is used for burning program into microcontroller.

5. WORKING

IR Sensor and Microcontroller do this job mainly. The obstruction is sensed by IR sensor and Microcontroller receives the signals produced by the obstruction from the sensors. The received signal is operated via program stored in ROM of microcontroller. Microcontroller does necessary calculation regarding it and Microcontroller will activate the relay and relay will turn on room appliances. IR sensor detect and count the number of individuals entering & leaving the room and by using seven segment display, it display the number of individuals. When an individual enters into a room then one counter is incremented by one and light in a room will be switched ON and when the individual leaves a room the counter is decremented by one and light and fan will be switched OFF.

6. ADVANTAGES

1. Low cost.
2. Easy to use.
3. Compact size, Easy to handle.
4. Serial on board programming.
5. No external programming voltage needed.
6. Less maintenance cost.
7. It has higher efficiency.
8. Safe and secure to use.

9. It is fast, effective & flawless service.
10. Highly reliable and efficient to use.
11. Implement in single door.

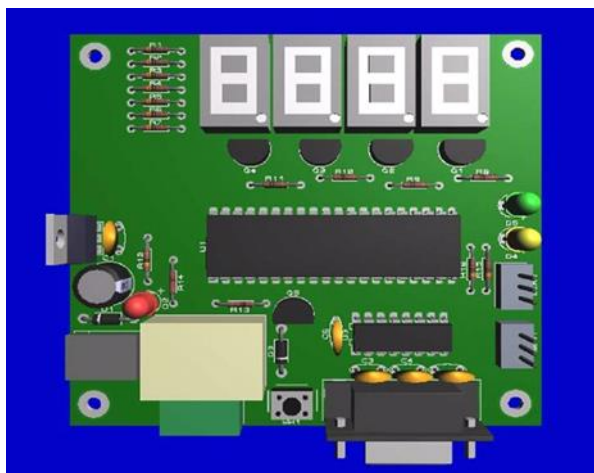
7. LIMITATION

It cannot be used when two person cross simultaneously, it is used only when one single person cuts the rays of the sensor.

8. APPLICATIONS

1. For counting purpose.
2. For automatic room light controller.
3. Used in rooms like seminar hall, conference hall, schools, auditorium, hospitals, malls, offices, etc.

9. CIRCUIT BOARD



10. CONCLUSION

This project deals with the usage of the energy in this competitive world of electricity. This project also helps to reduced human efforts. Also it is very useful to conserve resources. AUTOMATIC ROOM LIGHT CONTROLLER USING MICROCONTROLLER ATmega16 & IR SENSORS is a system to control room light as well as count the number of persons entering the room. The system works as, when an individual enter into the room the light is turn ON and one more feature is that it count the number of individual present inside the room and display it on the seven segment display. It is very useful in schools, hospitals, malls, offices, auditorium, etc.

ACKNOWLEDGEMENT

We express our thanks to the support given by management in completing our project. We also express our sincere gratitude & deep sense of respect to our guide P. D. Pawar and Co-guide A. N. Shire. I would

like to thanks all my friends who helped me directly or indirectly in endeavor and infused their helped for the paper.

FUTURE SCOPE

1. We can be added Voice alarm system to indicate that room is full and persons cannot enter inside.
2. It is possible to increase the maximum number of persons that can be counted by implementing the external EEPROM IC.
3. We also can send this data to a remote location using mobile or remote using GSM technology, IOT technology.

REFERENCES

- [1]. Y.Vivekananth, R.Kalpna, G.Malarvizhi, P.Mounika, S.Muniyappan, "Bidirectional Visitor Counter UsingIoT", International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Website: www.ijirce.com Vol. 5, Issue 3, March 2017
- [2]. E.Shilpa, Bushra Begum, Sara Sultana, Ali Mohsin Mohammad, Mohammed Kashifuddin, "Implementation of Automatic Room Light Controller with Visitor Counter Design using 8051 Microcontroller", International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Website: www.ijirce.com Vol. 5, Issue 2, February 2017
- [3]. Faizan Arif Khan, Prabhat Ranjan Sarkar, Saima Rahman, Fatima Yasmeen, "Zigbee Sensor Based Automatic Room Light Controller with Visitor Counter", ACEIT Conference Proceeding 2016
- [4]. Alex Joy¹, Athul S. Thoppil², Basil P. Alias³, Lekshmy S. Kurup⁴, Rini Varghese, "Microcontroller Based Room Automation".
- [5]. Abhishek N Vaghela, Bhavin D Gajjar, Subhash J Patel, "Automatic Switch using PIR Sensor", International Journal of Engineering Development and Research (www.ijedr.org) IJEDR1701109 © 2017 IJEDR | Volume 5, Issue 1 | ISSN: 2321-9939
- [6]. Kimbley¹, Rachit Mehrotra², Sohail Ahmed Khan³, Sonali K. Pawar, "Automatic Room Light Controller Using Microcontroller And Visitor Counter" IJRET: International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308 Volume: 05 Issue: 03 | Mar-2016, Available @ <http://www.ijret.org>