IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
 Journal Volume 10, Iss 02, 2021

AUTOMATIC ROOM LIGHT CONTROL WITH VISITOR COUNTING TO POWER SAVE

[1]B.Suresh Reddy,[2]N.Pooja,[3]O.Mohan,[4]M.Rachana Reddy

[123]Assistant Professor,[4]Student

Department Of EEE

Christu Jyothi Institute Of Technology &Science,Colombo Nagar,Telangana

Abstract:

This project is written to enhance the use of resources in developed as well as developing countries. In this digital world, use of technology is very advanced and we prefer things to be done automatically without any human efforts. This project also helps to reduce human efforts. Also it is very useful to conserve resources. In today's world, there is a continuous need for automatic appliances. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. Also if at all one wants to know the number of people present in room so as not to have congestion, this circuit proves to be helpful. "Automatic room light controller with visitor counter" is a reliable circuit that takes over the task of controlling the room lights as well us counting number of persons/ visitors in the room very accurately.

I.INTRODUCTION

In today's world, there is a continuous need for automatic appliances. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. Also if at all one wants to know the number of people present in room so as not to have congestion, this circuit proves to be helpful. Automatic Room Light Controller with Visitor Counter is a reliable circuit that takes over the task of controlling the room lights as well us counting number of persons/ visitors in the room very accurately. Electricity is one of the most important resources in this century. We should conserve the electricity. But many times we come outside the room/hall and forget to turn off the lights/fan, thus the electricity is wasted. To overcome this we are going to implement a project called "Automatic room light controller with visitor counter". This project has 2 modules. First module is "Visitor counter" and the other module is "Automatic room light controller". Main concept behind this project is to measure and display the number of persons entering in any room like seminar hall, conference room. And when number of persons inside the room is zero, power supply inside the room will be turned off. This will help to save electricity. LCD display placed outside the room displays number of person inside the room. When somebody enters into the room then the counter is incremented by one and the light in the room will be switched ON and when any one leaves the room then the counter is decremented by one. The light will be only switched OFF until all the persons in the room go out. The total number of persons inside the room is also displayed on the LCD. The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of program which is stored in ROM. Microcontroller continuously monitor the Infrared Receivers. When any object pass through the IR Receiver's then the IR Rays falling on the receivers are obstructed. This obstruction is sensed by the Microcontroller. However, it implies the possibility that inconvenience of users can be bigger because of frequent light on/off, and dark indoor environment, etc. whereas the energy saving effect becomes larger.

This project is very useful for such problems as one generally forgets to turn off lights and fans while leaving a 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 a room. This project has two parts. One is "Individual count" and other is "Automatic room light Controller" We use IR sensors to detect number of individuals entering in a room. This circuit counts the number of individuals and displays the count on the seven segment LCD display to avoid congestion. This project is very helpful in schools and colleges for their auditorium. "AUTOMATIC ROOM LIGHT CONTROLLER USING MICROCONTROLLER AND VISITOR COUNTER" as the name specifies that it controls the task of counting the number of individuals and lights of a room with accuracy. When an individual enters into a room then one counter is incremented by one and one light in a room will be switched ON and when the individuals leaves a room then the counter is decremented by one. When there is no individual in a room then lights will be switched off automatically.

Advantages: 1.Low Cost. 2.Easy to use. 3.Implement on Single door.

II.LITERATURE REVIEW

This section describes about the most commonly used lighting control system used in buildings. Since this method is going to use wireless sensor network it is mandatory to know the operation of existing lighting control system. It can be decided that energy loss is occurred with a lighting system when the lighting system illuminates a light which is an area which is not being used currently at that particular time or when it illuminates a light even though sufficient lighting is available to work. The most commonly used lighting system is explained below. Switch operated manually: In this method a user has to switch ON and OFF the required lights. Since the user can switch on and off the lights as per their preferences there is a chance of keeping the lights in on state even though it was not need during that time. This may occur because of carelessness of user and a large amount of power is wasted. III. PROPOSED SYSTEM This system is designed by using two sets of IR transmitters and receivers. These IR sensors are placed in such a way that they detect a person entering and leaving the room to turn the home appliances. In this optimun energy management system, a microcontroller is the central processing unit of this project which is of 89S51 controller from the 8051 family. This system facilitates a bidirectional visitor counter for displaying the number of persons inside the room. When a person enters into the room, an IR beam is obstructed between the IR transmitter and the receiver. This IR obstruction from the sensor-1 gives the corresponding signal to the microcontroller. The microcontroller is programmed in such a way that by the reception of the signal from the sensor-1 it turns on the fans and lights inside the room. Thus, the microcontroller gives command signals to a relay driver which turns the relays such that all these appliances turn on. When the person leaves from this room, another set of IR sensors enable and give control signals to the microcontroller. Furthermore, similar to the above process, this system turns off the appliances like fans and lights. Apart from this, the system also takes account of the number of persons inside the room so that this control operation is varied depending on the persons' availability in the room. For every person entering and leaving the room, the microcontroller reads the digital input from two receivers, and calculates the number of persons inside the room, and then displays it on the LCD. When the persons' count is greater than one, the microcontroller turns on the room light and when the persons' count is zero, it turns off all the lights and fans.

III.DESIGN OF HARDWARE

This chapter briefly explains about the Hardware . It discuss the circuit diagram of each module in detail.

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.Arduino board has the following new features:

- 1.0 pinout: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.
- Stronger RESET circuit.
- Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

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ISSN PRINT 2319 1775 Online 2320 7876
 Journal Volume 10, Iss 02, 2021

Fig: ARDUINO UNO

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

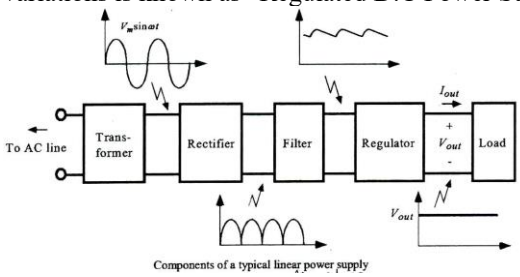


Fig: Block Diagram of Power Supply

IR SENSOR

Infrared is a energy radiation with a frequency below our eyes sensitivity, so we cannot see it Even that we can not "see" sound frequencies, we know that it exist, we can listen them.

Even that we can not see or hear infrared, we can feel it at our skin temperature sensors. When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel in your skin.

IR RECEIVER

The TSOP17.. – series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.

The demodulated output signal can directly be decoded by a microprocessor. TSOP17..is the standard IR remote control receiver series, supporting all major transmission codes.

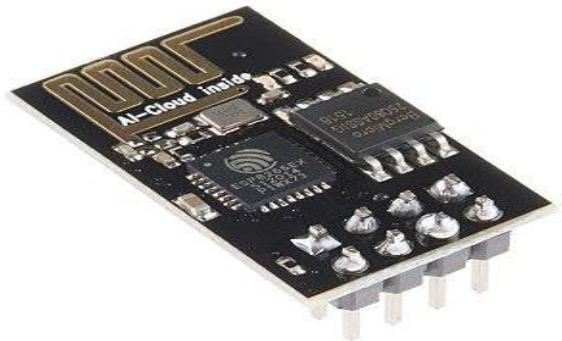
ESP8266 WIFI

The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems.[1]

The chip first came to the attention of western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.[3]

The **ESP8285** is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.[4]

The successor to these microcontroller chips is the ESP32.



RELAYS

We know that most of the high end industrial application devices have relays for their effective working. Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.

The main operation of a relay comes in places where only a low-power signal can be used to control a circuit. It is also used in places where only one signal can be used to control a lot of circuits. The application of relays started during the invention of telephones. They played an important role in switching calls in telephone exchanges. They were also used in long distance telegraphy. They were used to switch the signal coming from one source to another destination.

IV. PROJECT DESCRIPTION
BLOCK DIAGRAM:

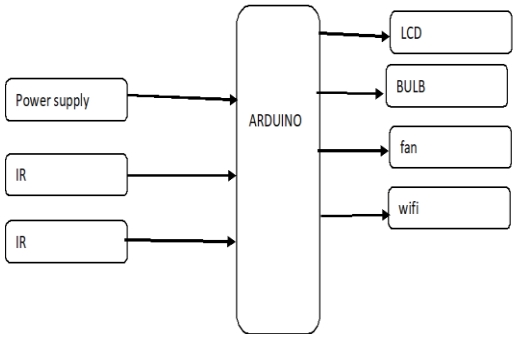


Fig block diagram

SOFTWARE REQUIREMENTS:

- arduino

HARDWARE REQUIREMENTS:

- Transformer
- Diodes
- Capacitors
- WIFI
- IR
- Transistor
- Microcontroller

WORKING:

This system uses Infrared(IR) sensors to detect obstacles. The basic concept of IR(infrared) obstacle detection is to transmit the IR signal(radiation) in a direction and a signal is received at the IR receiver when the IR radiation bounces back from a surface of the object. The other feature present in the system would be the Visitor counter which is displayed on PC monitor which will help congestion control in the room . There is also a emergency LED which gets switched on when all LEDS fail to switch on. The same is shown on the PC monitor. All this features are controlled by the Microcontroller which is programmed using assembly language.

If the sensor 1 is interrupted first then the microcontroller will look for the sensor 2. And if it is interrupted then the microcontroller will increment the count. When the first person enter the room then the counter goes to 1 and that time the FAN/LIGHT will turn on. If the sensor 2 is interrupted first then the microcontroller will look for the sensor 1. And if it is interrupted then the microcontroller will decrement the count. When the last person leaves the room then counter goes to 0 and that time the FAN/LIGHT will turn off.

V.CONCLUSION

In our paper, we have designed and implemented a BiDirectional Counter & Home Automation using the concept of Embedded System. The target users of the project can be any one right from a common man to any organization. Lets say if any one uses our project for Seminar Purpose then the track record of the persons attending the seminar will give the exact idea about the no. of candidate attending and leaving the seminar and accordingly the Project Model will control the Electronics Gadget of the Seminar Hall, In making this project. This project is useful in developing countries and this project has a bright future. In this digital world Technology is very advanced and we prefer things to be done automatically without any human efforts. This project also helps to reduce human efforts. Also it is very useful to conserve resources. It is very useful in Schools, hospitals, malls, offices, auditoriums etc. This gives lots of knowledge of software as hardware.

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