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# Implementation of Automated Various Equipments in Hall for Energy Conservation

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**ABSTRACT:** In this world, existence without electricity is unbelievable; subsequently it is everybody's liability to save electricity. However, due to the busy schedule, most one has a timetable in which it is difficult to remember switch off lights and fans when they're not being used. Commonly it is seen lights and fans in the study hall, seminar hall and auditoriums remain turned on over the course of the day Which increases our as well as country's electricity consumption this is a major worry in most of the country. Now it is our responsibility and duty too to conserve the electricity and to reduce the wages. Instructive foundations Throughout the course of recent years, Critical headway has been made, and by carrying novel plans to the domain of customer gadgets. We can robotize the cycle utilizing new innovation control of the office's primary power supply It enormously diminishes the power in the homeroom utilization. Mechanization offers some type of advantage. This paper is composed to improve the utilization of assets in created as well as emerging nations. In this computerized world, utilization of innovation is extremely cutting-edge and we favor action items naturally with next to no human endeavors. This article assists with decreasing the human endeavors.

**KEYWORDS:** Light, Image processing, Lighting and cooling.

## I. 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 Crisis is the big problem faced by everyone. So there is a need to conserve energy. This paper is very useful for such problems as one generally forgets to turn off lights and fans while leaving a room [1]. The aim of this paper 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 three parts. One is "Individual count" and second is "Automatic Equipments Controller" and third is "temperature sensor and speed control". 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 LCD display to avoid congestion. This paper is very helpful in schools and colleges for their auditorium. as the name specifies that it controls the task of counting the number of individuals and lights up the room accurately. When an individual enters into a room then counter is incremented by one and lighting and cooling start accordingly and as the counting of person are increases lighting and cooling stepped up, & controlled with gathering in the same way when the individuals leaves a room then the counter is decremented by one. When there is no individual in a room then lights and fans will be switched off automatically. The speed of fan will be controlled by varying the voltage of the fan according to the temperature.

The Arduino Nano is a versatile microcontroller board that is used in this paper for controlling lighting and cooling of a any covered space. The Arduino Nano is very compact & relatively inexpensive which makes it ideal for projects compared to other microcontroller boards.

### ❖ Components

- Relay (5v)
- Arduino Nano
- Resisters
- IR Sensor module (2)
- 16x2 LCD display
- Bread Board
- Connecting Wires
- Led

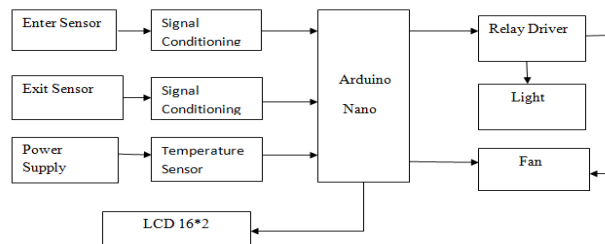


❖ **Software**

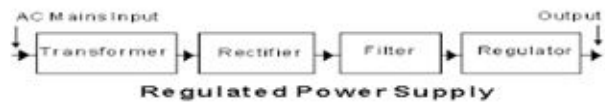
- Requirements Embedded C.
- Proteus(Processor for text East to use):
- It is a Software used for simulation. It was created by Simone Zanella in 1998. It is fully functional and procedural. It consists of many functions and languages. Flash Magic
- It is used for burning program into microcontroller.

**II. OVER VIEW OF DESIGN**

The basic block diagram of the automatic light controller using microcontroller and bidirectional visiting counter is shown in the figure below.

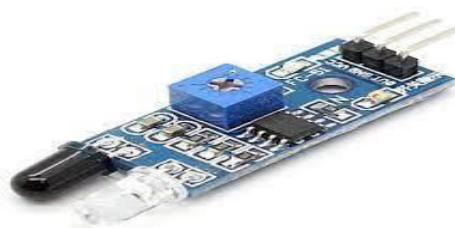


**Power Supply**



We have used +12V and +5V dc power supply. Step down transformer off 1 Amp, 230V, 50 Hz provides +12V ac supply. It provides required amount of voltage to components. +12V is given to relay driver circuit. Arduino nano and LCD require 5V dc supply.

**IR Sensors**



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 numbers of individuals entering a room. IR2 detects the number of individuals leaving a room. The frequency range of IR sensors varies depending upon its cost. By using LED light at specified wavelength as required by the sensor, we can look at the intensity of the received light. When any object cuts the light emitted by LED, the light bounces back from the object to the light sensor. This results in a large change in the intensity, which is detected by receiver of IR sensor



### Arduino Nano



The **Arduino Nano** is a small, complete, and breadboard-friendly board. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor. The Arduino Nano is equipped with 30 male I/O headers, in a DIP-30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery. It executes instructions in a single cycle. Arduino achieves throughputs approaching 1MIPS per MHz allowing the system design to optimize power consumption versus processing system. XTAL1 gives Input to the inverting Oscillator amplifier and input to the internal clock operating circuit. XTAL2 pin is used for Output from the inverting Oscillator amplifier. It does the job of room light controller as well as counting number of individuals entering and leaving a room accurately. Arduino continuously monitors the IR receivers and executes the program stored in its ROM when it receives the signal from the sensors.

### LCD 16x2



LCD (Liquid Crystal Display) is used to display number of individuals in a room. It is very thin technology based on combination of liquid and crystal. Liquid state produces an image for display.

### Relay Driver Circuit



In relay driver circuit there are transistors, diodes and the relays. Relay driver circuit is used to control the light. This block can drive the various controlled devices. We are using +12V dc relay. As  $\mu\text{C}$  cannot drive relay directly so output signal from microcontroller is passed to the base of the transistor, which activates the particular relay so that it can select particular device to operate. Relays can control the charge flowing to the load. Load may be and AC device such as light, fan, Bulb etc.

### Load

Relays control the flow of charge to the load. In this project we have used four bulbs of 10 Watt each as a load. But we can use any electronic object like tubelight, CFL, fans, cooler etc in place of bulbs.

### III. WORKING

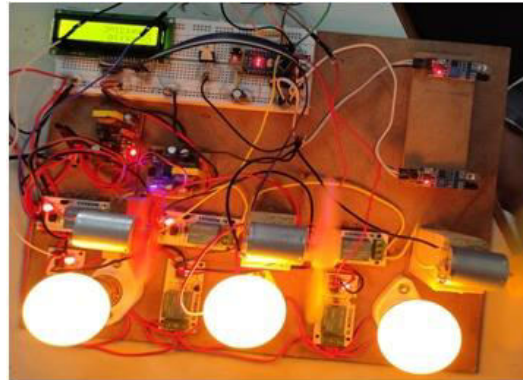


Fig. Circuit Board

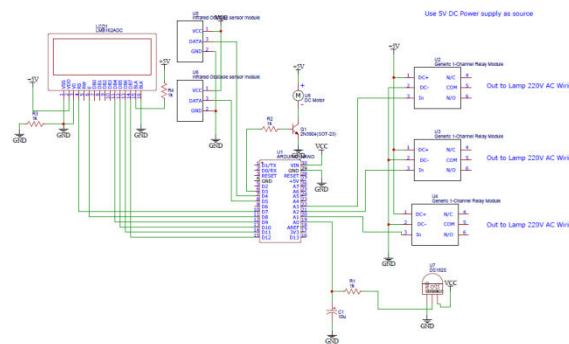


Fig. Circuit Diagram

The IR sensor return high value when an obstruction is made in front of it. The Arduino Nano signals the counter to increment by 1. Similarly, as the instruction goes on one by one, the counter will increment by the same. For the reverse process, the IR sensor has to be interrupted in reverse order, that means the person has to go out of the room as the person leaves the room, the counter will decrement by one.

According to this circuit module, the circuit is designed in such a way that when any person enters the room, that is, move right to left in front of the sensors, the counter will increment by one, and the electrical load of row one will be switched on. Now, again, the person will enter, the counter will increment by one, and on and on, as the counter value reaches to 4, the electrical load of row 2 will be switched on. Similarly, the counter reaches to 7, the electrical load of row 3 will switch on. It will be switched off in reverse order as the counter will decrease. The fan speed will be controlled according to the temperature.

### IV. ADVANTAGES & DISADVANTAGES

- The main advantage of this project is that it helps in energy conservation. Because when there is nobody inside the room, then the electric load is automatically turned off.
- The light and fan will not operate if no person is present inside the room.
- Displays the number of persons present inside the room.
- Human efforts to count the number of persons are eliminated. Since this project does the automatic person counting with the help of two sensors installed on the door frame.
- ❖ It is low cost and easy to use.
- ❖ Convenience - Turning on the electrical load will be as easy as walking inside the room. No need to search for the switches on the wall. The lighting system will automatically turn off the lights when it does not sense any movement for a certain period of time.
- ❖ The fan speed will be controlled automatically according to the temperature.



- ❖ It is used only when one person cuts the rays of the sensor hence cannot be used when two or more persons cross the door simultaneously.
- When anybody is inside the room and we need to switch off the power then we've to do it manually. So, in this case we fail to automatically control the light.

#### **V. APPLICATION**

- Digital Visitor Counter can be used in various rooms like seminar hall, conference hall where the capacity of the room is limited and should not be exceeded. The project will display an actual number of persons inside the room.
- “Automatic Room light Controller with Visitor Counter” can be used in classrooms, study rooms in colleges.
- Automatic Room light Controller project can also be used in our home because many times we come out of our bedroom or any other room and we forgot to turn off the room light.
- The Bidirectional person counter project can be used in Cinema halls, multiplex, malls as well as in temples to count the number of a person entering inside. So that these places should not get overcrowded to avoid congestion
- It can also be used as home automation system to ensure energy saving by switching on the loads and fans only when needed.

#### **VI. FUTURE SCOPE**

- By using this circuit and proper power supply we can implement various applications.
- By modifying this circuit and using two relays we can achieve a task of opening and closing the door.
- Voice alarm may be added to indicate room is full and person can't enter in the room.
- We can send this data to a remote location using a mobile or internet.
- Thermal imaging can be used for thermal signature.

#### **VII. CONCLUSION**

- The theme of this project when merged with certain established technologies can be quite effective in number of countries like Germany, France and Japan, etc. which control the train.
- Thus project helps us to control the lights of a room automatically, counts the number of persons or visitors entering and leaving the room.

#### **ACKNOWLEDGEMENT**

We have taken efforts to complete this model. But this would not be possible without the help of our team. We are very thankful to all of them. Also we are thankful to Prof. Vaibhav Shukla for her guidance, supervision and providing important data regarding the project named “Implementations of Automated & Controlled Various Hall's Equipments for Energy Conservation”. We would also like to thank our parents for their support and encouragement which gives us inner strength to complete this work.

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