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Automatic Room Lights Controller with Visitor Counter

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Abstract: In this paper we present the design and construction of a Automatic room lights controller with visitor Counter . This a reliable circuit that takes over the task of counting number of persons / visitors in the room very accurately and displays the actual number of people on the LCD and beeps a warning alarm when the number of visitors exceeds the capacity limit of the auditorium/hall and displays a warning message on the LCD. This avoids the congestion of people in a room/hall/auditorium which is a need in the present pandemic situation due to COVID-19. We have also implemented the circuit to control and monitor all electrical equipment's or appliances in the room/hall automatically based on the presence of the people present by the use of the Arduino has a main controller .The fan's speed is regulated according to the temperature in the room .If no one is present in the room the fans and lights are switched off automatically. By this we avoid the intervention of human/person to control electrical appliances like light bulbs, fans etc. manually. Here IR sensors are used to identify entry and exist of the people. This automation will save lots of electricity and economically cost effective to implement it**.**

Keywords: Arduino Uno, IR Sensors, Fan, LCD, light bulbs.

I. INTRODUCTION

Nowadays technological innovation has led to automation in many fields like home appliances, cars, industries etc. We are inevitably depending on automation in order to save money and time as well. It may be confusing/time consuming task for a person to count the actual number of people entering and exiting the room/hall. To avoid this automation is needed which is reliable. Our aim is to develop a bidirectional visitor counter which will count the number of people inside the room accurately at a given particular time and turning on and off the electrical appliances like bulbs, fans etc. based on the number of people present inside. The buzzer beeps a warning alarm when the capacity of the room/hall exceeds and displays a warning message on the LCD.

Electricity is one of the most important resources in the present world. We should conserve the electricity. But many times, we forget to turn off the lights/fan and thus the electricity is wasted. Since we are automating the turning on/off the electrical appliances using our project called as "Automatic room lights controller with visitor counter" we can save a lot of electricity and money. Counter is incremented by a value when someone enters the room and lights, etc are switched ON automatically and the counter is decremented by a value and lights, etc are switched off when the count value becomes zero. The Arduino Uno is the main heart of this controlling system which receives the signals from sensors and process it according to the predefined software code in order to control the whole system. Also the total number of person in the room will be displayed in the LCD thus making this system a very user friendly. We also regulate the fan according to the temperature inside the room/hall.

II. LITERATURE SURVEY

A detailed analysis of the existing systems was performed. This study helped in identifying the benefits and also the drawbacks of existing systems.

►Automated Light Controller with Visitor Counter System – By Guruprasad Hebbar

This paper describes the working of visitor counter for counting the number of visitors using IR sensors and controlling of the lights automatically based on the presence of people 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 anyone 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 display monitor (LCD). But this paper doesn't concentrate on regulation of the fan speed according to the temperature in the room/hall.

►"Design of Smart Power Controlling and Saving System in Auditorium by using MCS 51 Micro controller's " - By Sunil Kumar.Matangi, Sateesh Prathapani

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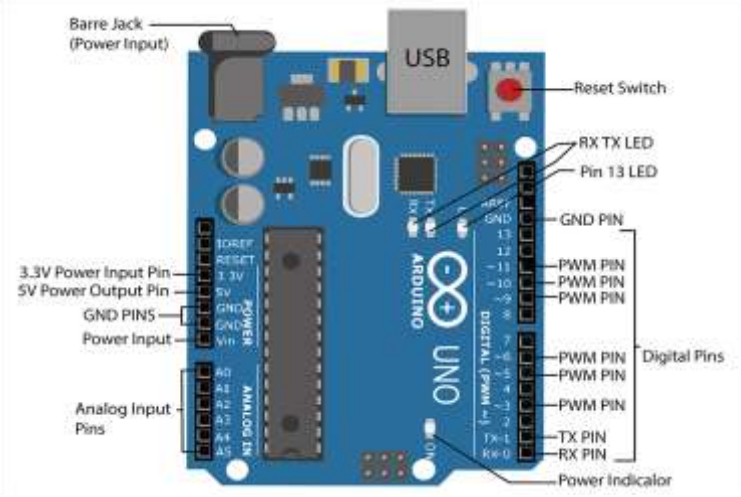
The main aim of this paper is to design and employ of power saving in general public places like auditoriums, shopping malls and theaters etc. To control and monitor all these equipment's or appliances we need a person or controlling system. This paper describes the complete working of electrical and electronic devices with automatic control and also power saving in theaters, shopping malls and auditoriums. To implement this they have used MCS 51 family microcontroller, IR sensors, 16X2 LCD (Liquid Crystal Display). MCS 51 family Microcontroller is used to control the total operation. In our project we have implemented using Arduino since programming for microcontroller 8051 is difficult and also even Circuit gets complex and difficult, to avoid this we have selected Arduino for controlling the circuit.

III. SYSTEM COMPONENTS

A. Hardware Components

ⅰ. Arduino Uno Board

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs , a 16MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. Operating voltage is 5v dc supply.



ⅱ. IR Sensor

An IR sensor can measure the heat of an object as well as detects the motion. The radiations are invisible to our eyes, which can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photo diode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.

ⅲ. Liquid Crystal Display(LCD)

Liquid Crystal Display screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments & other multi segment LED's. A 16x2 LCD means it can display 16 characters per line & there are 2 such lines.

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iv. LM35

LM35 is a temperature measuring device having an analog output voltage proportional to the temperature. It provides output voltage in Centigrade (Celsius). It does not require any external calibration circuitry. The sensitivity of LM35 is 10 mV/degree Celsius. As temperature increases, output voltage also increases.

v. Relay Relay is an electromechanical device that can be used to make or break an electrical connection. When a elay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

vi. DC Motor: DC motors are rotary electrical machines that convert electrical energy into mechanical energy (Rotation).

vii. Active Buzzer

The active buzzer has an internal oscillating source, and the buzzer will sound as soon as it is energized. The active buzzer is widely used in computers, printers, copiers, alarms, electronic toys, automotive electronics, telephones, timers and other electronic products for sounding devices.

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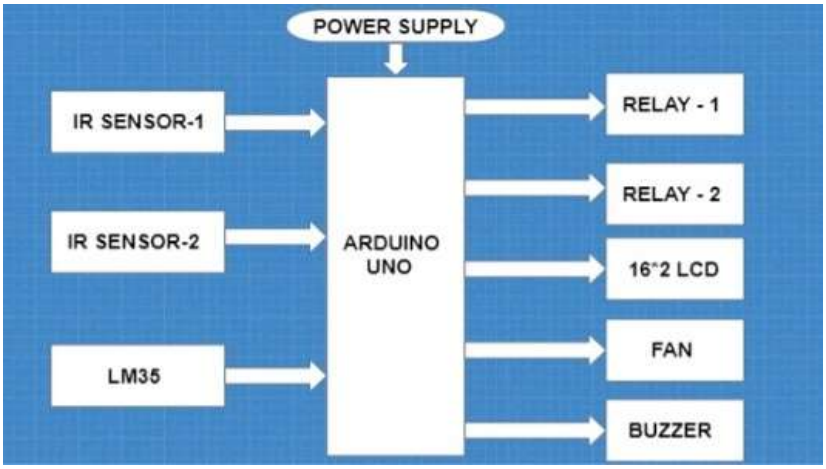
B. Software Used

ⅰ. Arduino IDE

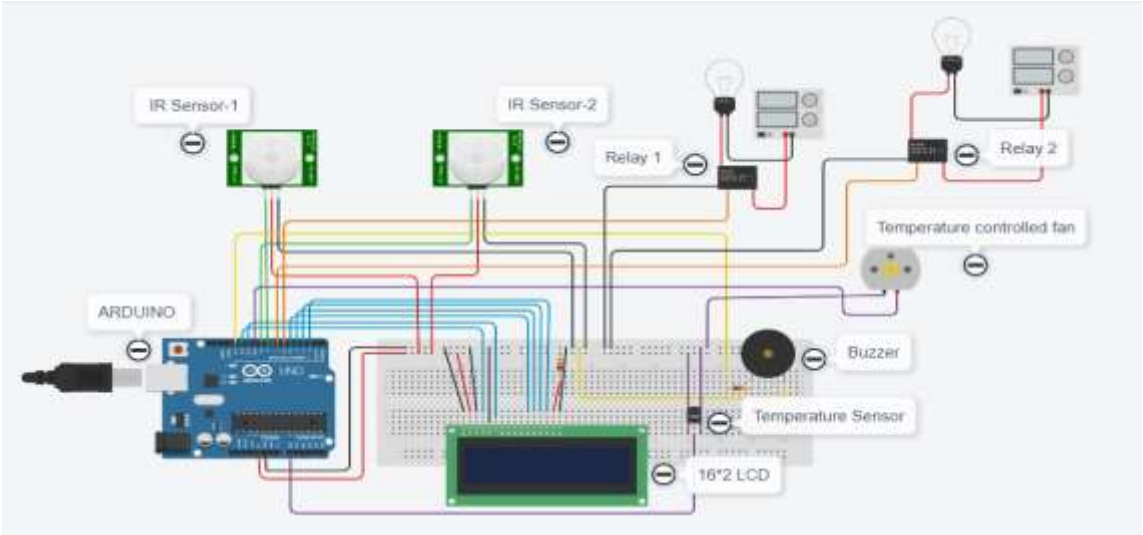
Software used to control this system is Arduino IDE (Integrated Development Environment). This software is used to write the program and compile it to the Arduino Uno board. We can program using c/c++ language.

IV. SYSTEM WORKING

Our proposed system architecture can be represented using the block diagram below



A. Circuit Operation



The System is based on the interruption of IR beam. An IR beam is used as the source of light beam. Functioning of the system starts with detecting the entry of the people to the room/hall and keeping a track of number of people in it. This

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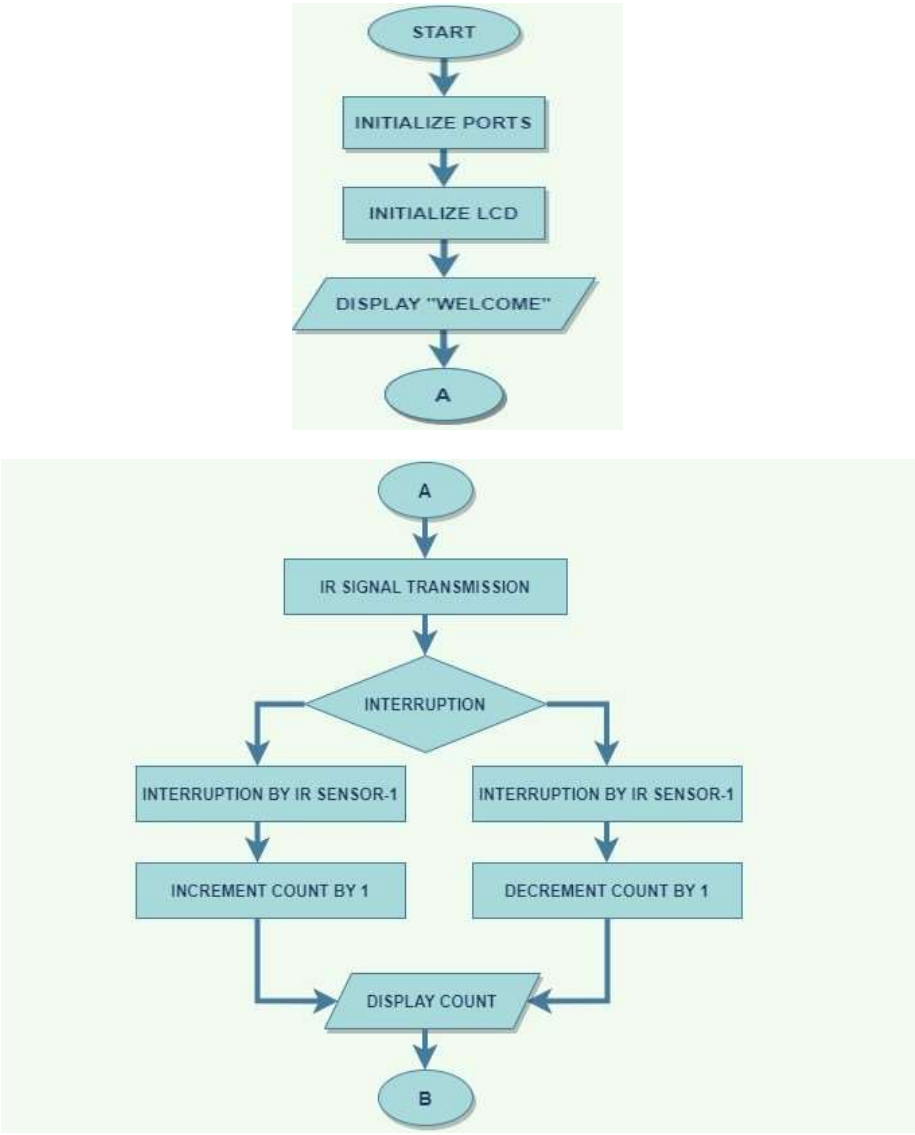
count is the parameter to control the appliances like light bulbs ,etc. The entry sensor and exit sensors are kept at the entry and exit doors to detect the people entering and leaving the room/hall which gives a signal to the microcontroller which will have the count of number of people inside and will be displayed on the LCD screen.

Initially when there is no one in the room/hall , all the electrical appliances are switched off. The output of the IR sensors are connected to arduino uno digital pins and the IR sensors on the interruption produce high or low pulse which is fed to arduino uno as input and the microcontroller (on boardATmega328) checks the condition by processing the input according to the program code , if interruption occurs by IR sensor-1 then the count is incremented by one and if interruption by IR sensor-2 then the count is decremented by one. If the room/hall reaches the maximum capacity then the buzzer is switched on and a warning message is displayed on the LCD, whereas here we have fixed maximum capacity as ten people.

The temperature sensor will sense the temperature inside the room/hall and give a voltage corresponding to temperature which is fed to arduino as input which in accordance controls the speed of the fan inside the room/hall.

B. Flow Chart



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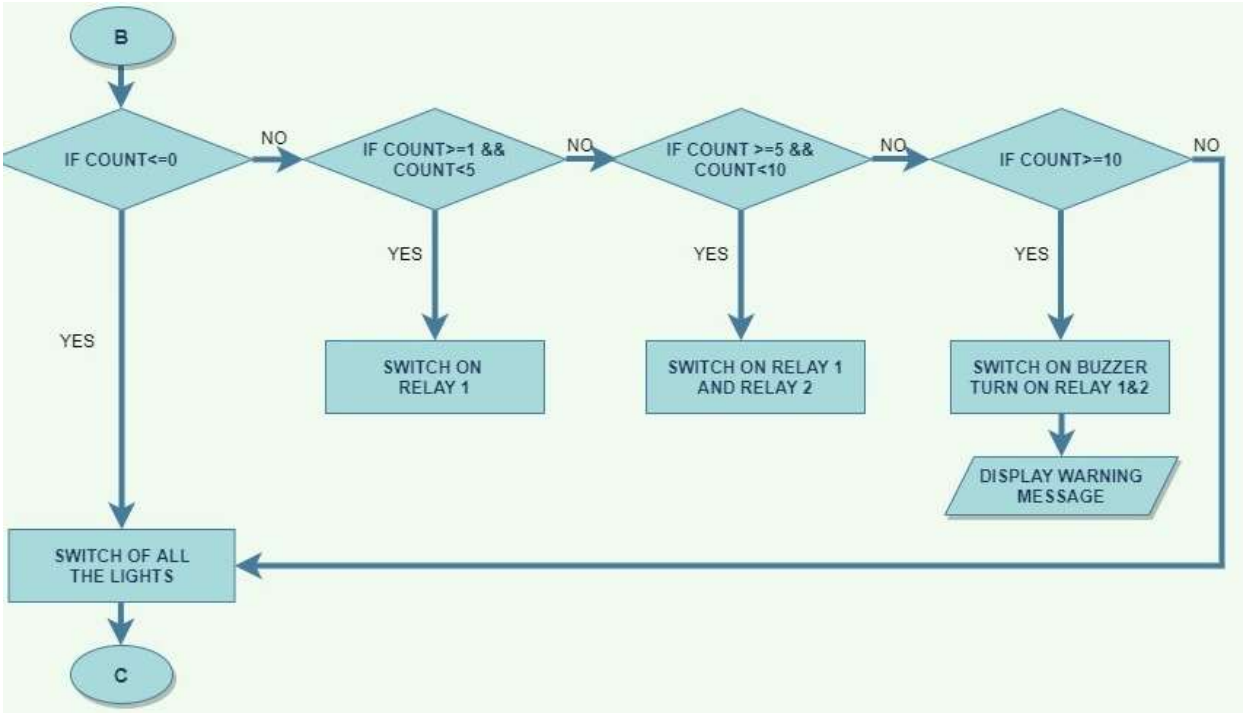

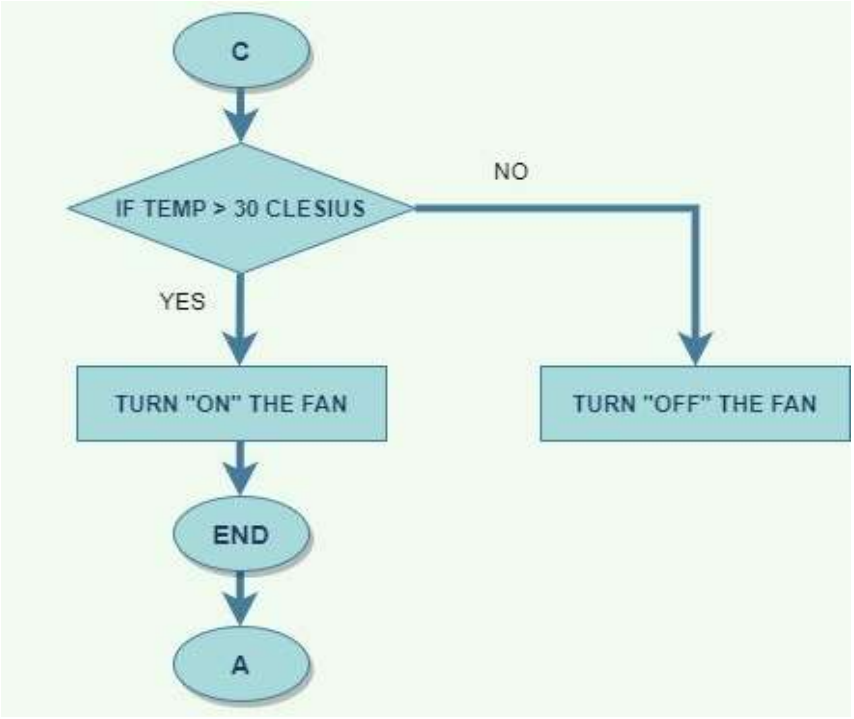

V. FUTURE ENHANCEMENT

-We can send this data to a remote location using mobile or internet
-By modifying this circuit we can achieve the task of opening and closing the door.
- A metal detector can be used at the entrance

VI. RESULT AND CONCLUSION

We have implemented the circuit using the Tinkercad (Autodesk) for simulation of the circuit and as well as hardware implementation of the circuit has been done and we have got accurate results.

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An economical architecture to control the electrical appliances using Arduino uno is proposed and implemented successfully. This system is an effective way for the power management, automatic device control and together count, temperature and power consumption. Using this circuit we can avoid electricity wastage and even congestion of the people inside a room/hall

REFERENCES

[1]. Sunil Kumar.Matangi, Sateesh. Prathapani, "Design of Smart Power Controlling and Saving System in Auditorium by using MCS 51 Microcontrollers". Nishitha College of Engineering & Technology.
[2]. Automated Light Controller with Visitor Counter System - Guruprasad Hebbar, ECE Department BNM Institute of Technology, Bangalore, India
[3]. Electronichub-https://www.electronicshub.org/bidirectional-visitor-counterusing-8051-microcontroller/
[4]. Prof. Dr. Subhash P. Rasal "Implementation of Visiting Counter" International Journal of Emerging Trends in Electrical and Electronics