

# Bidirectional Visitor Counter with Automatic Control for Various Applications

Vatte Hari<sup>1</sup>, Peerampally Pavan<sup>2</sup>, Bandla Raghavender Reddy<sup>3</sup>, Himanshu Sharma<sup>4</sup>  
<sup>1,2,3</sup> Student, ECE Department, J B Institute of Engineering and Technology, Hyderabad  
<sup>4</sup>Associate professor, ECE Department, J B Institute of Engineering and Technology, Hyderabad

**Abstract**— 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. Many times, we need to monitor the people visiting some place like shopping mall. To provide solution for this we are going to implement a project called “Bi Directional Digital Visitor Counter” with automatic room light control.

This project has a “Visitor counter”. Basic concept behind this project is to measure and display the number of persons entering in any room like seminar hall, conference room etc. LCD displays number of persons inside the room. We can use this project to count and display the number of visitors entering inside any conference room or seminar hall. This works in a two way. That means counter will be incremented if person enters the room and will be decremented if a person leaves the room. In addition, it will automatically control room lights. when the room is empty the lights will be automatically turn off. Digital Visitor Counter bidirectional visitor counter in today’s world, there is continuous need automatic appliance will be increase in standard of living, there is a sense of urgency for developing circuit that would ease the complexity of life. Also, if someone wants to know the number of persons present in a room so as not to have congestion, the circuit prove to be helpful. The theme of this project when merged with certain established technologies can be quite effective in number of countries.

**Index Terms:** Arduino, LCD, IR Sensors.

## I.INTRODUCTION

Bidirectional Visitor Counter with Automatic Control is a reliable Circuit that takes over the task of controlling the room lights as well as counting number of person’s visitors in the room very accurately when somebody enters into the room then the Counter is incremented by one value and the light

in the room will automatically switched ON and when any one leaves the room then the counter is decremented by one value and 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 displays. The Arduino Uno does the above job. It receives the signals from the sensors, and this signal is operated under the control of software called Arduino (IDE). Also, in addition the total number of persons in the room be incremented value or decremented value will always be displayed in the LCD thus makes this system a very user-friendly.

## II.PURPOSE OF STUDY

The aim of our project is to make a controller which can sense if any person enters the room and it lights up the room automatically and also counts how many persons are entering the room or going out of it and also measures the humidity inside the room.

## III.BLOCK DIAGRAM

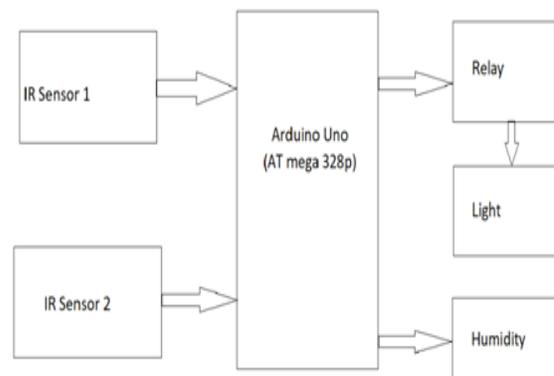


Fig 1 : Block Diagram for project

## IV.HARDWARE PLATFORM

The hardware part mainly consists of a digital computer, an Arduino Uno board, Infrared Sensor module, 16x2 LCD displays, Relay module.

**A. Arduino Uno**

An Arduino board [1] historically consists of an Atmel 8-,16-or 32-bit AVR microcontroller with complementary components that facilitate programming and incorporation into other circuits. An important aspect of the Arduino is its standard connectors, which let users connect the CPU board to a variety of interchangeable add-on module termed shields. Some shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via an I<sup>2</sup>C serial bus—so many shields can be stacked and used in parallel. It provides 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. This board has a 5-volt linear regulator and a 16 MHz crystal oscillator.

**B. Infrared Sensor Module**

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. 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 photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED

**C. 16x2 LCD Display**

LCD 16x2 is a 16-pin device that has 2 rows that can accommodate 16 characters each. LCD 16x2 can be used in 4-bit mode or 8-bit mode. It is also possible to create custom characters. It has 8 data lines and 3 control lines that can be used for control purposes.

**D. Relay-Module**

Relay is an electromechanical device that uses an electric current to open or close the contacts of a switch. The single-channel relay module is much more than just a plain relay, it comprises of components that make switching and connection easier and act as indicators to show if the module is powered and if the relay is active or not.

Proposed System: Finally, we conclude that the proposed system will count visitors effectively and

efficiently by reducing the rate at which error occurs when counting visitors. As the project was to design and construct a device that would count and display the exact number of people in a building, the following recommendation however should be considered to ensure effective operation of the digital bidirectional visitor counter. The sensors should be positioned at the entrance in a way not to attract visitor’s attention. The device should be installed at a narrow entrance suitable for only one person to pass through at a given time.

An uninterruptible power supply should be introduced to the system to serve as a backup power supply. In the near future, some institutions that deem it necessary to monitor their crowd may no longer rely solely on human auditors and unsophisticated counter systems to tally the number of visitors. In anticipation of this, we recommend the following for Takoradi Polytechnic.

**V.CIRCUIT DIAGRAM**

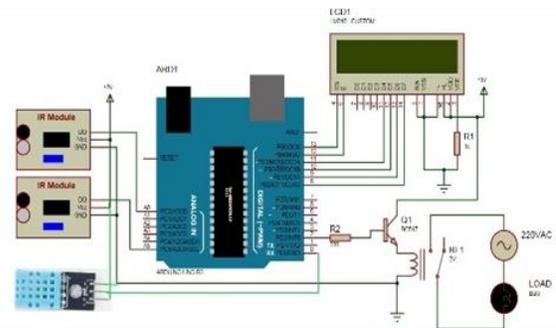


Fig 2 : Circuit Diagram for project

**VI.RESEARCH METHODOLOGY**

The operation of the experimental kit changes according to the position of the switch. Let us suppose that the kit is placed at the desired location. The basic operation of the kit would be that when a person enters in that area the IR sensor absorbs the black body radiation emitted by that person and activates. Depending upon the switch position the operation will change. When one person enters the room the IR sensor (the transmitted infrared waves from IR transmitter reflects from that object and is received by the IR receiver. IR sensor gives 0 or LOW in this condition and it displays the number of persons on the 16x2 LCD display. Even if there is one person in the room the light will automatically in

the ON state and displays 1 on LCD display. When a person leaves the room i.e., when a person passes through IR Sensor 2, the decreases the count of number of people inside the room and finally if number of people inside the room becomes zero the light automatically switches to OFF state.

Arduino enables users to monitor various kinds of sensors such as IR sensor and motion detectors in real-time. The analog and digital pins on the Arduino board can serve as general purpose input and output pins (GPIO). Usually, The ATmega328 microcontroller embedded on the Arduino board contains the analog-to-digital converter (ADC), which converts the analog input signal to a number between 0 and 1023. When Arduino check for zero condition (Zero condition means no one in the room) and finds it is true then Arduino turn off the bulb by deactivating the relay through transistor. And if zero condition is false then Arduino turns on the light. Here is two functions for enter and exit. This increment or decrement is displayed in LCD

#### VII.MODELLING KIT

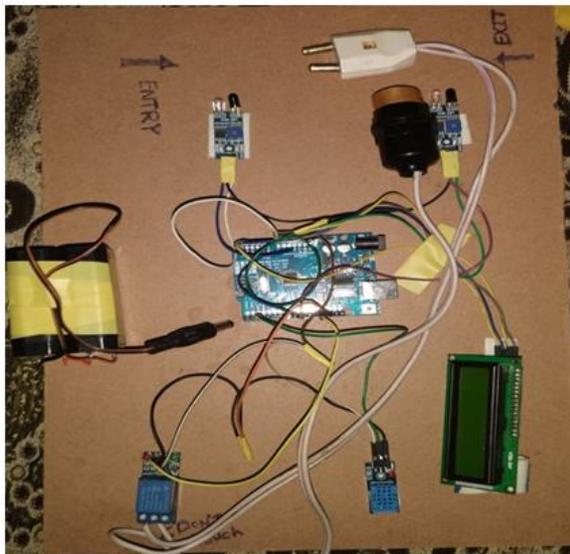


Fig 2 : Model Kit for project

#### VIII.SIMULATION TOOLS

This project is implemented using following software's:

- Express PCB – for designing circuit
- Arduino IDE compiler - for compilation part

#### IX.ADVANTAGES AND APPLICATIONS

Advantages:

1. Automatic power saving system
2. Efficient and low-cost design.
3. Low power consumption.
4. Save man power

Applications:

1. Auditorium
2. Shopping malls
3. School and Office
4. Rest Rooms at public places
5. Hospitals

#### X.CONCLUSION

A novel architecture for an economic bidirectional Visitor Counter and room lighter controller is proposed and implemented in this paper. It gives basic idea of how to control the bidirectional visitor counter and room light counter using Arduino Uno and Arduino (IDE). The cost of this technology is very economical. This project uses low cost off the shelf components, and is based on Arduino platform which is FOSS (Free Open Source Software). So the overall implementation cost is very cheap and is affordable by a common person. This low-cost system is designed to improve the living standard ancomplexity of visitors counting. It provides accurate data and eliminating the error where possible. For future work, some recommendation can be made like, addition of cameras through with not only counting but also the image can be stored precisely. Wireless connectivity can be added to system, by controlling the Wi-Fi modules. The whole system can be fabricated as economic commercial hardware package

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