International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

Bidirectional Visitor Counter with Automatic Room Light Controller

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Abstract - *Automated appliances are in high demand in today's world. With rising living standards, there is an urgent need for the development of circuits that would reduce life's complexity to simplicity. This project, titled "Bidirectional Visitor Counter with Automatic Room Light Controller," is designed and presented to count visitors to an auditorium, hall, offices, malls, sports venue, and so on. The system tracks both entering and exiting visitors to the auditorium, hall, or other location where it is installed. The system identifies the visitor's entry and exit based on the interruption of the sensors. When the system is successfully implemented, it displays the number of visitors present in the auditorium or hall. When used in places where visitors must be counted and controlled, this is a cost-effective system. Counting visitors can be time consuming, so it helps to maximise employee efficiency and effectiveness, time savings, and an organization's sales potential, among other things.*

Keywords: IR Sensor Module, Arduino UNO R3, Relay, LCD Display, etc,.

1. INTRODUCTION

Bidirectional Visitor Counter with Automatic Room Light Controller is a dependable Circuit that takes over the task of controlling the room lights as well as counting the number of visitors in the room quite accurately. When anyone enters the room, the Counter is incremented by one value and the light in the room is automatically switched ON. When someone leaves the room, the Counter is decremented by one value and the light in the room is automatically switched OFF. On the LCD screens, the total number of people in the room is also seen. The above task is performed by the Arduino Uno. It receives signals from sensors, and this signal is regulated by Arduino software (IDE)[10]. Furthermore, the total number of people in the room, whether incremented or decremented, will still be reflected in the LCD, making this device very user friendly.

2. HARDWARE PLATFORM

The hardware consists primarily of a digital cpu, an Arduino Uno circuit, an Infrared Sensor module, 16x2 LCD screens, all of which are addressed in detail along with their basic functions

A. Arduino UNO

Historically, an Arduino board consists of an Atmel 8-, 16-, or 32-bit AVR[14] microcontroller with complementary components that allow for programming and integration into other circuits. The Arduino's standard connectors are an essential feature since they enable users to link the CPU board to a number of interchangeable add-on modules known as shields. Few shields interact directly with the Arduino board via different pins, but several shields are individually addressable via an I2C serial bus, allowing many shields to be stacked and used in parallel. It provides 14 digital I/O pins, six of which can produce pulse width modulated signals, and six analogue 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[21].

B. Infrared Sensor Module

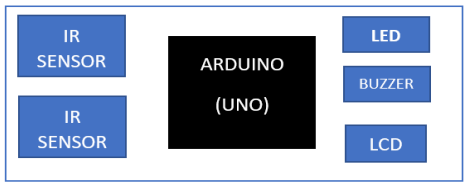
An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. The radiations are invisible to our eyes, which can be detected by an infrared sensor. The emitter is simply an IR LED[12] (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. 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 and other multi segment LEDs. The reasons being: LCDs[11] are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

3. METHODOLOGY

In this paper our main aim is to propose model for visitor counter. Proposed system architecture is shown in



A block diagram representing the circuit developed

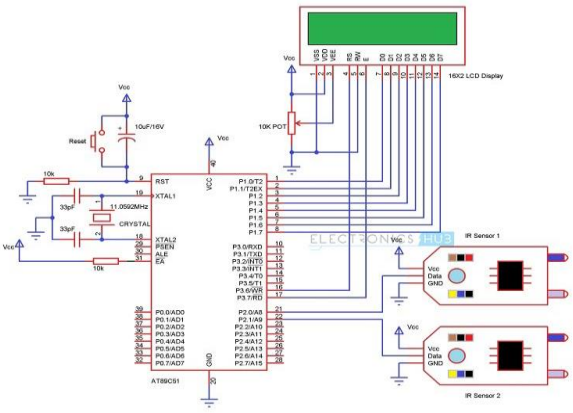
The system is built on the interference of an infrared wave. The source of light is an infrared beam. There are two parts in the Bidirectional Visitor Counter with Automatic Room Light Controller and Arduino as the master controller. An IR diode[13] is used as the transmitter. It must be powered by a 5 volt DC supply and installed on one side of the door frame. On the front end of the receiver is an RX.

A. Controlling Actuators

Finally, the activation is handled by the Arduino gateway. When continuously tracking sensors in real time. The Arduino reacts in real time to monitor the on/off of the lead and the buzzer. This machine is divided into two sections: the transmitter section, which provides power and the light output, and the receiver section[16], which provides the power and the light output. The other is the receiver part, which takes light input and implements it on the enters sensor circuit and exit sensor circuit.

B. System Protection

Sometimes, irrational variations in power supply damage the system's components. As the BD139 transistor[18] is supplied with input power and supplies outputs to the modules, it not only provides a liner power supply but also guards against power surges.



Cicuit diagram

4. Result

We built a prototype that represents the system in order to incorporate and explain the technically formed system. As a result, the whole structure that is being implemented as seen below.

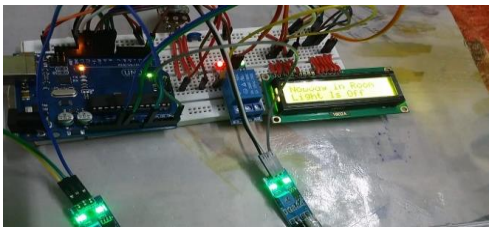


Fig-1 : implement of project

We can see different sections of the formed circuit board in this figure, which is connected with the Arduino's [17]digital and analogue pins where appropriate. The picture above shows the visitor counter panel modelled by Arduino(IDE), which includes all of the above-mentioned components.

5. CONCLUSIONS

This paper proposes and implements a novel architecture for an economic bidirectional Visitor Counter and space lighter controller. It explains how to use Arduino to power a bidirectional [19]guest counter and a room light counter. The cost of this equipment is very low. This project makes use of low-cost, off-the-shelf materials. As a result, the net deployment cost is very low and affordable to the average consumer. This low-cost scheme is intended to increase the quality of living and the difficulty of guest counting. It contains reliable data and strives to eliminate errors whenever possible. Any recommendations for future work can be made, such as the installation of cameras from which not only the count but also the image can be precisely processed. Through managing the Wi-Fi modules[20], wireless networking can be applied to the device. The whole device can be designed as a low-cost commercial hardware kit.

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