Bidirectional Visitor Counter with Automatic Light Controller

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Abstract – In state-of-the-art international, there is a non-stop need for automated equipment. With the increase in this international, there may be an immediate need for developing circuits that might trade the complexity of existence to simplicity. This undertaking's called "Bidirectional visitor Counter using Arduino " is designed to matter the number of visitors in the auditorium, in a function hall, offices, department stores, sports venue, and so on. The tool counts all people getting into and exiting the auditorium or corridor or different vicinity. Relying upon the sensor's interruption, the device identifies the access and exit of someone. At the hit implementation of the device, it displays the variety of human beings present in the auditorium or corridor. That is a cost-powerful, fee decreasing system even as implemented in locations in which the site visitors need to rely on and control.

Keywords – IR Sensor module, Arduino (IDE), Counter.

I. INTRODUCTION

Automatic room and visitor counter When someone enters the room, the counter is increased by one value and the lights in the room will be automatically switched ON. When someone leaves the room, the counter is decremented by one value and the lights are turned off until everyone in the room is left. The light controller is a dependent circuit that handles the task of turning the room lights as well as counting the number of people visitors in the room very precisely. The OLED monitors also show the overall number of people in space. This task is completed by using the Arduino IDE.
It receives signals from sensors, and the software called Arduino operates on these signals (IDE).

II. LITERATURE REVIEW

Demand-controlled ventilation [1] (DCV) can be adjusted based on the room occupancy levels. In this study the feasibility of a visitor counting sensor network in occupancy detection was evaluated. A network with 15 sensor spots and real-time activity visualization was designed and assembled at the Aalto Design Factory building. Direct sensitive light beam and infrared (IR) camera sensors were used. Counting data was collected for one week. The sensor spots divided the building into ten zones and the zones occupancies were calculated in five-minute intervals. The results suggest that the visitor counting errors can easily accumulate over time and the use of correction factors or a more sophisticated counting algorithm is needed. The operation of a visitor sensor-based DCV could also be complemented with CO_2 sensors to guarantee both sufficient ventilation and a short response time.

The author [2] proposes to count the in- and-out visitors to monitor visiting frequency and population, which can be applied for many indoor places, such as shops and restaurants. Therefore, we present the first Wi-Fi-based in-and-out visitor counting system, Door-Monitor, which obtains the direction (enter or exit) and the number of visitors passing by the door. The Wi-Fi signal enables us to count the visitors in a low-cost and nonintrusive way, and it can tell the exact number of visitors even when multiple persons pass by the door simultaneously. To detect the visitors' passing direction, we show that the patterns in the phase difference series can indicate the entering and exiting passing directions by analysing the effects of the passing behaviour on the signal's phase information. To count the passing visitors, we perform a short-time Fourier transformation on the phase difference series to generate the spectrogram, on which the convolutional neural network is applied for building a counting model. The experimental results show that the average accuracies of passing direction detection and visitor counting are 95.2% and 94.5%, respectively.

In this paper [3] we are presenting the result of simulation-based energy efficient bi-directional visitor counting machine (VCM) on FPGA (Field Programmable Gate Array). In this work, we have used Xilinx software. We have used different IOs standards that include HSTL_I, HSTL_II, HSTL_I_18, HSTL_II_18, LVCMOS12, LVCMOS15, LVCMOS18, LVCMOS25, and LVCMOS33. For these IOs standard we have collected the total energy dissipation for this bi-directional VCM on FPGA and compared them. It is observed that at 5GHz frequency HSTL_II is the lowest energy dissipation for this Bi- directional Visitor Counting Machine (VCM) on FPGA. FPGA is more effective than using any micro-controller in the perspective of energy efficiency.

This Paper [4] displays the plan for industrial Automation utilizing Arduino. It gives the exact number of people in and industry bi-directional and also gives a warning alarm if the number exceeds the limit. Depending upon the number of people inside, electrical gadgets will turn on and off. The temperature and humidity are detected. If the temperature exceeds, it gives a beep alarm.

This paper [5] presents the design and construction of a digital bidirectional visitor counter (DBVC). The DBVC is the reliable circuit that takes over the task of counting the number of persons/visitors in the room very accurately and beeps a warning alarm when the number of visitors exceeds the capacity limit of the auditorium/hall. When somebody enters the room, the counter is incremented by one (+1) and when anyone leaves the room then the counter is decremented by one (-1). The total number of persons inside the room are also displayed on the LCD
(Liquid Crystal Display)

This project [6] is a dependable circuit that takes over the work of managing the room lighting as well as using an accurate visitor counter to tally the number of people in the room. The counter increases by one when someone enters the room, and the OLED light in the space is turned on. When someone leaves the space, the counter decreases by one. Only until everyone in the room has left will the light be turned off. [7] The display monitor also shows the overall number of people in the space. The micro-controller handles the aforementioned task. It receives signals from the sensors, and this signal is controlled by software that is kept in the ROM. A microcontroller constantly keeps an eye on the infrared receivers. Any object passing through an infrared receiver will block the infrared rays that would otherwise strike the receiver. The microcontroller picks up on this impediment.

III. METHODOLOGY

Installing the gadget is now possible after uploading the visitor counter code to the Arduino Board. The device can be powered on using a 5V DC adapter [8].

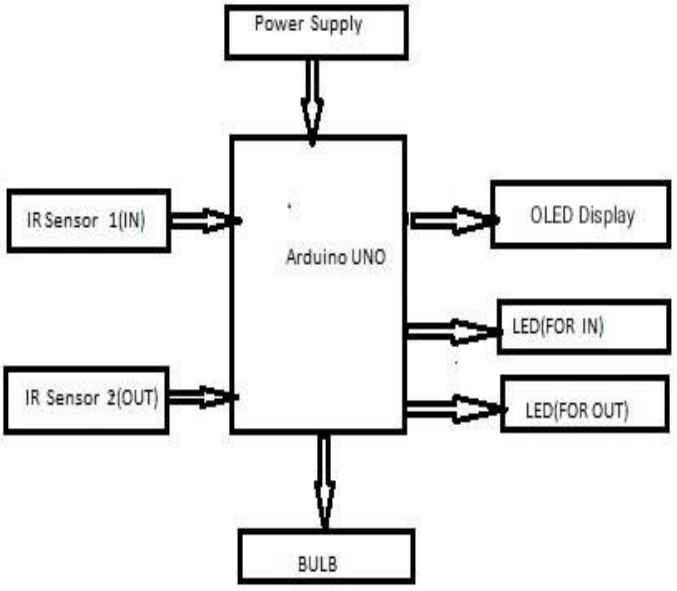

Fig1. Block Diagram

The above block diagram (Fig 1) includes power supply, IR sensors 1(IN) and 2(OUT), Arduino UNO, light bulb, LED for IN and OUT, OLED display. The movement of a person is detected by the sensors. When a person enters the room, IR sensor 1(IN) will detect the person entering the room. IR Sensor 2(OUT) will detect the person leaving the room.

The power supply will provide the power for the light ON. [9] The light in the room will be ON turned on when there is a person in the room. The number of people in the room, entering and leaving the room will be displayed on the OLED display. The code is entered into the Arduino. We have LED (FOR IN) and LED (FOR OUT).

The gadget is equipped with two IR sensor modules. [10] The IR sensors must be placed on the inside of the room door and on the outside of the room door, one at the entrance and the other at the exit. The light will go off and the OLED display will indicate that there are no guests in the room when there are none, as shown in Fig. 2.

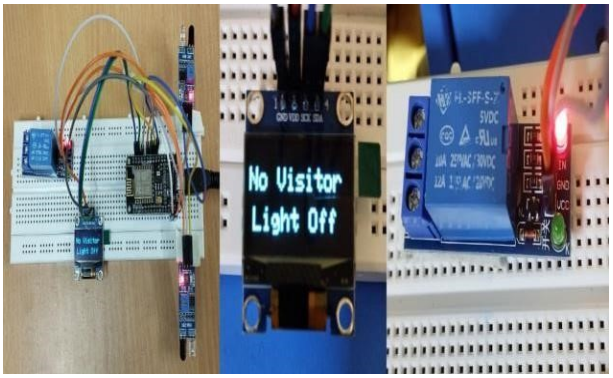

Fig 2. No one is inside the room and the lights are OFF.

The guest is added as they enter, and an OLED display shows how many new visitors have arrived. The light then switches on automatically at ON, as shown in Fig 3. The visitor is subtracted when someone leaves the room or leaves the building. As a result, OLED displays the current number of visitors

Fig 3. Showing the count of people who enter, and lights turn ON.

The OLED display also shows the number of guests who entered the room and the number of guests who left. This describes the operation of an Arduino visitor counter with the light control system. This project is suitable for use in halls, offices, schools, and other facilities as shown in Fig 4.

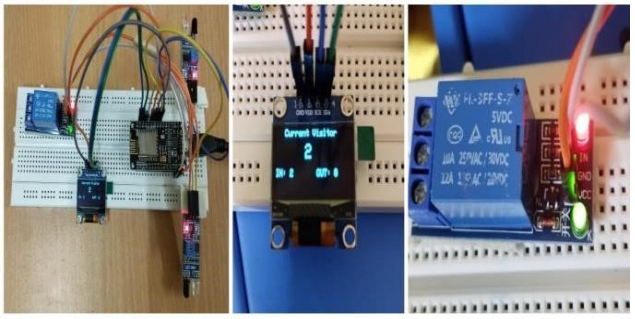

Fig 4. Showing the count when some people leave the room.

III. DISCUSSIONS AND CONCLUSIONS

In this paper, a novel design for a low-cost bidirectional visitor counter is presented and implemented. The basics of using Arduino to operate a bidirectional visitor counter and room light counter (IDE) are explained. This technology is extremely affordable in terms of price. Based on the Arduino platform, low-cost off-the-shelf components are used in this project. Therefore, the overall implementation cost is quite low and affordable to the average person. The goal of this low-cost solution is to increase the standard of living and simplify visitor counting. It provides correct information and minimizes errors wherever possible.

There are some recommendations for future work, such as the use of cameras that provide accurate image storage in addition to counting. Facial recognition sensors can be used for presence control. Wi-Fi module control enables wireless connectivity to be added to the system. The entire system can be manufactured as a low-cost commercial hardware kit.

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