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Implementation of Automatic Room Light Controller with Visitor Counter Design using 8051 Microcontroller

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ABSTRACT: As per the concern of the human disabilities in keeping counter of everything happening in and around the world we limit this project to increment the functioning of the visitors through the light controlling system which we wind up naming “Implementation of Automatic Room Light Controller with Visitor Counter Design using 8051 Microcontroller”. The system is proposed and designed in this paper that is the visitor counter that is bidirectional in feature which can read both the incoming and outgoing traffic and agents at same time securely. In this system, up to 999 incoming or outgoing visitors can be counted using microcontroller. Microcontroller is used here to make a secure count over a large number of visitors. The audacity of this project will not only give account of the person entering the room but will also light up according to the persons entered. This system is basically required in many places where count for the visitors is needed by the administrator of that system.

KEYWORDS: Microcontroller, IR Sensors, Visitor counter, Bidirectional count, Display device, Sensor system.

I. INTRODUCTION

In recent years, the count for the visitors become indispensable in many cases like in shopping mall, Hotels, restaurants etc. where the count is required to make a gratification of the proprietors who relies on electronics system for the count of the incoming or outgoing visitors or traffics [1][2][3]. The system proposed and designed here is bidirectional in nature that is it can count up by one when someone get enter into some place. When someone exits that place, the system decrease the count by one so to adjust the total count. The Digital Visitor Counter is available in market but it is necessary to be the system with bidirectional in nature [4][5]. The system includes a microcontroller for making complete control over the system for controlling its sub devices as well as counting the visitors. The output is set to be show on LED connected with it. Three 7-Segment display are connected with the system so that it can count up to 999 visitors [7][8]. The system can be used in any place where the count is necessary that is the place may earn by count or there may be a observatory which seeks the numbers of traffics or human enters into or departs from the place. For its counting purpose. Sensors are included which sense for the incoming and outgoing people or traffic [6][7][9][10].

II. RELATED WORK

In the past years, several well established institutions (libraries, community centers, auditorium, etc.) across the globe have encountered various incidents related to traffic monitoring. It has been a necessity to monitor the visitors to carry out the human traffic management task and tourist flow estimate to maintain accurate result for the organizational marketing and statistical research. This eventually indicates the patronage rate of goods and services by consumers. Therefore, we deem it appropriate to identify these problems encountered by our various organizations and find solutions to them by designing a digital bidirectional visitor counter (DBVC).

The primary method for counting the visitors involves hiring human auditors to stand and manually tally the number of visitors who enter or pass by a certain location. The human auditing application or the human-based data collection was

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unreliable and came at great cost. For instance, in situations where a large number of visitors entering and exiting buildings such as conference rooms, law courts, libraries, malls and sports venues, going for human auditors to manually tally the number of visitors may result in inaccurate data collection. For this reason, many organizations have tried to find solutions to mitigate the inaccurate traffic monitoring issues. It is our intention to design and construct this digital bidirectional visitor counter (DBVC) with maximum efficiency and make it very feasible for anyone who wants to design and construct the prototype. Building this circuit will provide information to management on the volume and flow of people in a building.

III. SYSTEM ARCHITECTURE

In this system, the traffic or agents or human follow a certain route or door or some threshold to enter into and to exit from the place. While entering to the system, there are two sensors are installed which are connected with each other via infrared network. While a visitor crosses the infrared bar or line, it is disconnected and at that time Microcontroller increase its count by one. The count is shown on the 7-Segment display. When someone crosses the bar in opposite direction, the infrared line is again interrupted and then Microcontroller decreases its count by one to signify that one visitor is entered and one is get away from the place.

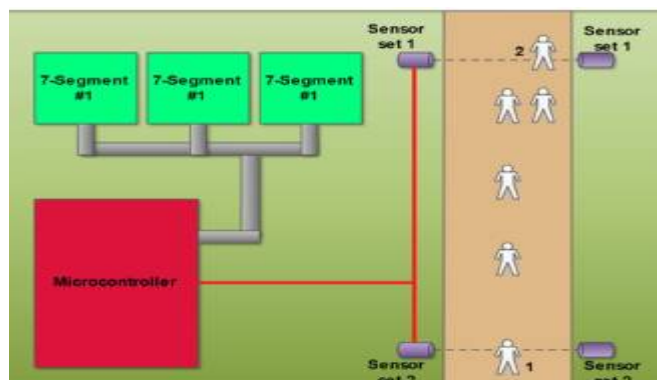
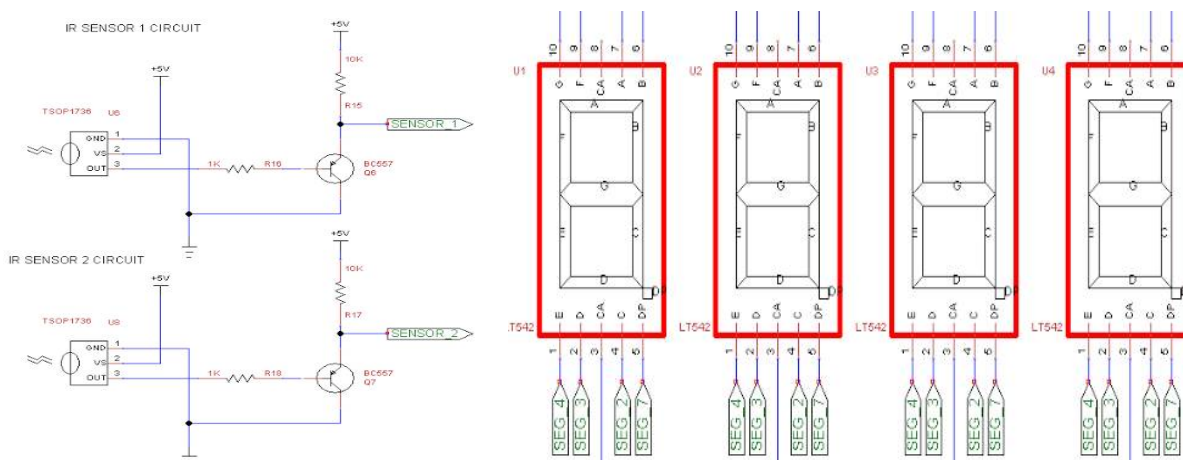


Fig.1 Block diagram of Bidirectional Visitor Counter



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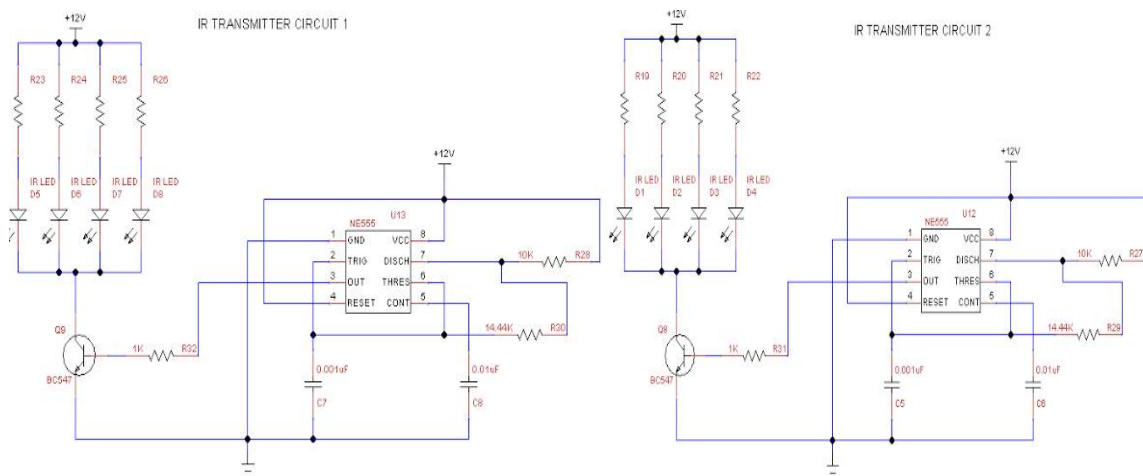


Fig. 2: Generalized circuit diagrams

a) AT89S52 MICROCONTROLLER

It is a low-power, high performance CMOS 8-bit microcontroller with 8KB of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the MCS-51TM instruction set and pin out. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful Microcontroller, which provides a highly flexible and cost effective solution for many embedded control.



Fig. 4 Microcontroller

b) SEVEN SEGMENT DISPLAY

In this system, the display module is interfaced that is constructed with Seven Segment Display. The display module is connected with the Microcontroller from where the data comes from and data is displayed on the module. Each and every time the poll result is shown on the display module. The element of the display module that is the Seven Segment Display is shown below.

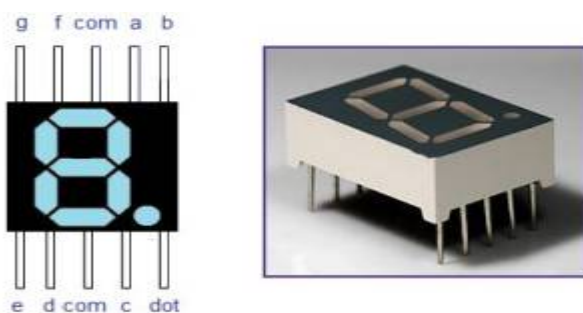


Fig.5 Seven Segment Display

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c) **INFRARED (IR) SENSORS**

The 2-pair of infrared (IR) which consist of a transmitter (TX) and a receiver (RX) is mounted face to face across the doorway. Both sensors are positioned at the entrance with distance apart. This means upon the approach of a visitor the installed 2-pair sensors are triggered by the obstruction. The direction of the visitor is determined by which sensor is obstructed first before the other sensor follows. If sensor 1 is interrupted first before sensor 2 is interrupted, it indicates that the visitor is entering. The visitor exits the premises by interrupting the sensor in opposite direction.

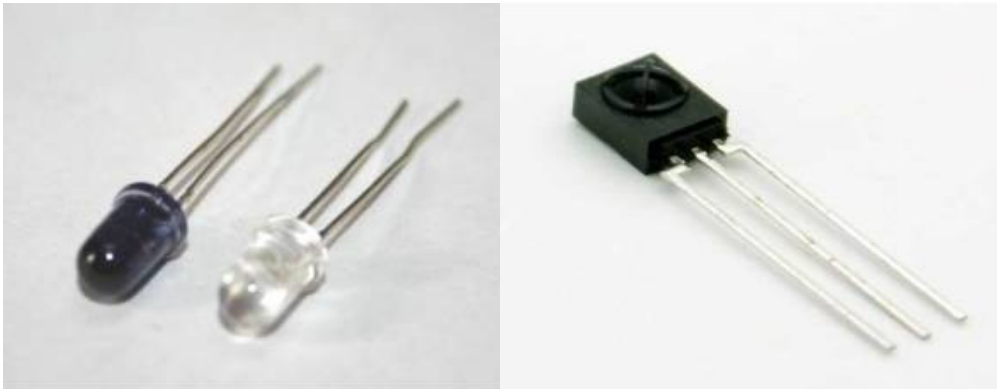


Fig.6 IR LED (T_x& R_x) Fig.7 IR Sensor

d) **POWER SUPPLY**

Here we used +12V and +5V dc power supply. The main function of this block is to provide the required amount of voltage to essential circuits. +12V is given to relay driver. To get the +5V dc power supply we have used here IC7805, which provides the +5V dc regulated power supply.

e) **ENTER AND EXIT CIRCUITS**

This is one of the main parts of our project. The main intention of this block is to sense the person. For sensing the person we are using a TSOP 1738 sensor. By using this sensor and its related circuit diagram we can count the number of persons.

f) **RELAY DRIVER CIRCUIT**

In relay driver circuit there are transistors, diodes and 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 μ 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 devices such as light, fan, Bulb etc.

g) **SOFTWARE REQUIREMENTS**

- Embedded C.
- Proteus (Processor for text editor to use): It is Software used for simulation and designing PCB layout. 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.

IV. RESULTS & DISCUSSION

The operation of the system is already been discussed in the previous section. In this section the operational algorithm will be shown how the complete system works along with the pseudo codes.

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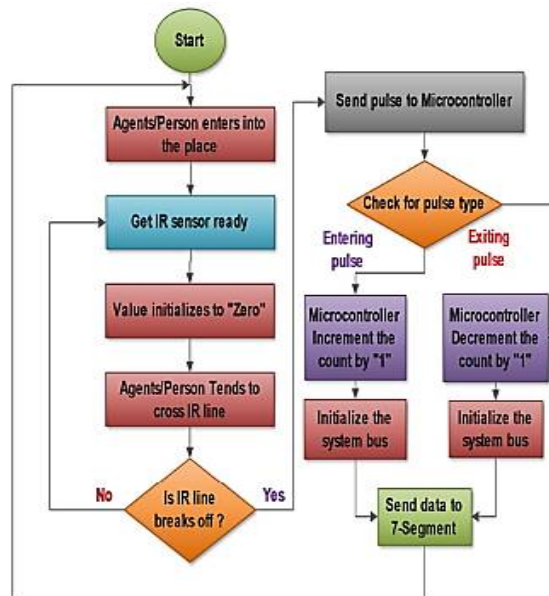


Fig.4 Algorithm for operation

Form Fig.4, the algorithm shown that the system iterates for infinite times until and unless the system is switched off or power cut. This is because the IR sensors after break off, automatically adjusted to go to the previous state that is the IR line is again connected in exact sensor set. The pseudo codes for the operation is shown below:

Start:

Sensor goes to initial state;

Setting sensor value (S_{val}) = 0;

Setting count ($M_{count}(n)$) = 0;

When

People cross the IR line;

IR line breaks off;

$S_{val} == 1$;

Send pulse (P_{sensor}) to Microcontroller;

Microcontroller check for pulse type;

If

P

Sensor == incoming;

$M_{count} = 1$;

Data send to 7-Segment;

$S_{val} = 0$;

Else

$P_{sensor} ==$ outgoing;

$M_{count} = M_{count}(n-1)$;

Data send to 7-Segment;

$S_{val} = 0$;

Goto Start;



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V. CONCLUSION

This project compacts with the usage of the energy in this competitive world of electricity. This project is well-organized enough to let someone know about the accuracy of the person entered and have taken the exit from the room. In any big hall if we want to count number of individuals it is very difficult as it results in congestion and disturbance to the whole class. This project turns out to be serving hand in such situation because it gives the count on LCD display. Also it controls the lighting system automatically according to how many persons are there in a room. Turning ON of lights will increase with increasing the individuals in a room. Turning ON of lights will decrease with decreasing the individuals in a room.

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BIOGRAPHY



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