IJIREEICE

ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 5, May 2016

Design of Controllable Bidirectional Visitor Counter

Abhishek Dey[1], Subhadeep Chakraborty[2], Sayed Safikul Islam[3], Milan Pramanik[4], Md. Arafat Hossain Malick[5]

Lecturer, Technique Polytechnic Institute, Hooghly, West Bengal, India[1, 2]

Project Fellow, Technique Polytechnic Institute, Hooghly, West Bengal, India[3, 4, 5]

Abstract: Digital Visitor Counter is device or system that can read the incoming and outgoing agents or traffics that tends to visit or physically visit a place and. 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. This system is essentially required in many places where count for the visitors is needed by the administrator of that system. The design and demonstrations are produced in this paper.

Keywords: Visitor counter, Bidirectional count, Microcontroller, Display device, Sensor system.

I. INTRODUCTION

In recent era, the count for the visitors become essential in many cases like in shopping mall, Hotels, restaurants etc. where the count is required to make a satisfaction of the administrators 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 [2][3][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 [1][3][5][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. PROPOSED DESIGN

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 [6][9][11][12]. While entering to the system, there are two sensors are installed which are connected with each other via infra red 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.

The design bock for the system is shown below:

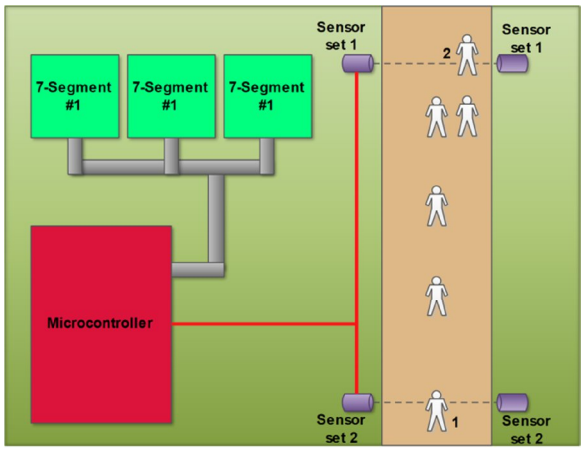

Fig.1 Block diagram of Bidirectional Visitor Counter

In the above figure, the person at place 1, first crosses the infrared line and when crosses, it breaks. The count is then shown on 7-Segment display like follows:

Fig.2 Count Increment

When person at place 2, crosses the infrared network or when the first person goes and breaks it, the count is decreased by one and the output is shown below:

Fig.3 Count Decremented

IJIREEICE
ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526
INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 5, May 2016

So, in this case, it is clear that the ultimate count is zero as the person enters into the place have departed from it. The operation and the algorithms are described in the preceding sections.

III. OPERATION AND ALGORITHMS

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.

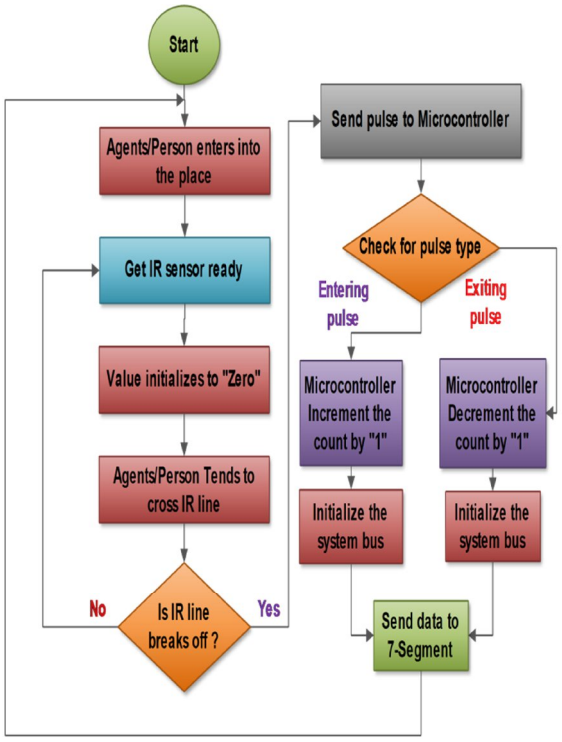

Fig.4 Algorithm for operation

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 eact sensor set.

The pseudo codes for the operation is shown below:

Start:
Sensor goea 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;

IV. COMPONENT REQUIRED

The components required to build up the system are discussed below with their properties.

A. 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.

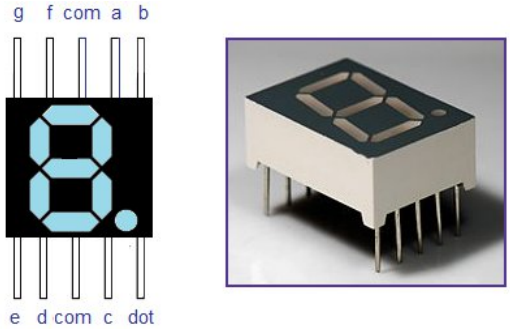

Fig.5 Seven Segment Display

B. Microcontroller

The entire system at the counting section is controlled by Microcontroller. For storage of the poll result, we have used the internal memory of the Microcontroller. The count inside the Microcontroller goes to the display module. Microcontroller used for using the internal memory and also it is capable of storing the result inside its memory whether the power will be OFF.

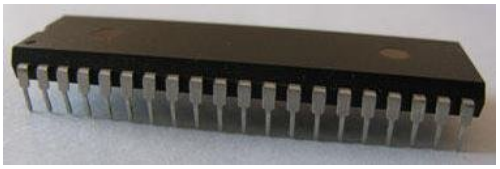

Fig.6 Microcontroller

C. IR Sensor

IR sensors are installed in both the sides of the lane or road or the way which the people follow for entrance or exit. A infrared line is connected in between the two sensors. When the line is breaks off, it sends pulse to Microcontroller. When the condition for the line breaking is removed, the IR line is again rejoined. This is the technique through which the determination can be obtained whether a person in entering or departing from a place where it is installed.

DOI 10.17148/IJIREEICE.2016.4533

IJIREEICE
ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526
INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 5, May 2016

Fig.7 IR Sensor

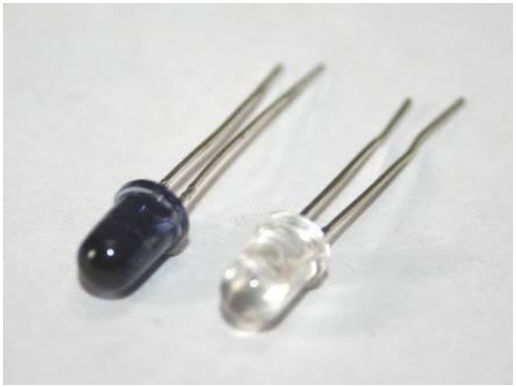

Fig.8 IR LED (Tx & Rx)

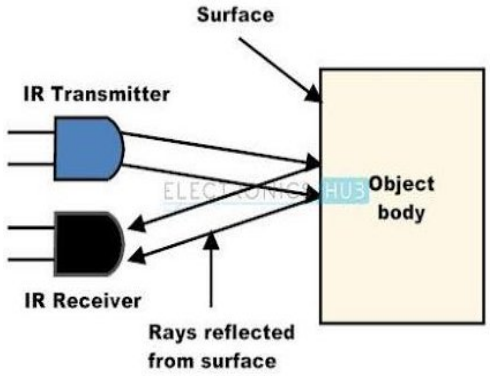

Fig.9 Operation of IR LED

V. CIRCUIT DIAGRAM

The system is designed first in Software in Multisim V 12.0 to check the response of the system that is designed. After getting proper and accurate response, the components are placed on project board to make a complete circuit.
This section shows the circuit diagram for the system, designed in Multisim V12.0.

In this circuit the microcontroller is used is AT89C51 introduced by Atmel Corporation©. The 7-Segments are controlled by the microcontroller as well as the rest of the circuit.

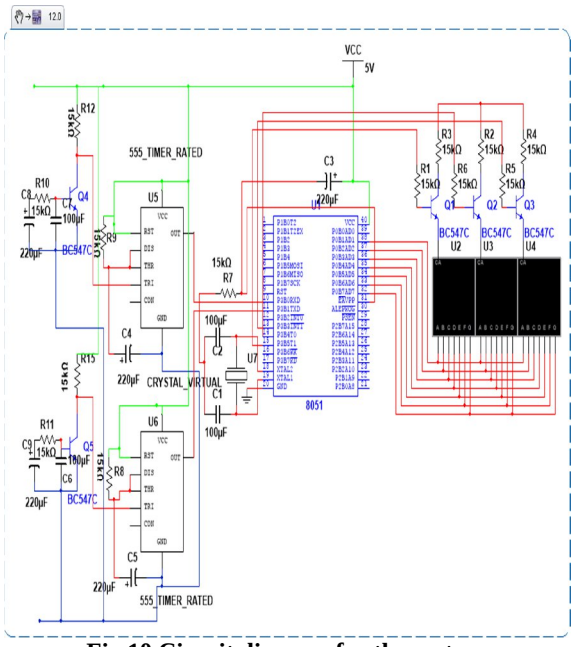

Fig.10 Circuit diagram for the system

The IR LED are connected with two 555 timer which are both in Astable configuration. When IR LED sends pulse, the timer circuit generates a square wave that is received by Microcontroller and in this way the rest operations, as described earlier, are executed.

VI. HARDWARE OF THE SYSTEM

The hardware of the system is designed using Vero board or project board by soldering the components on it. The complete hardware circuit is shown below.

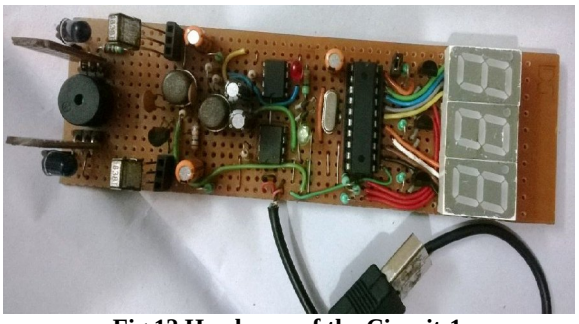

Fig.12 Hardware of the Circuit-1

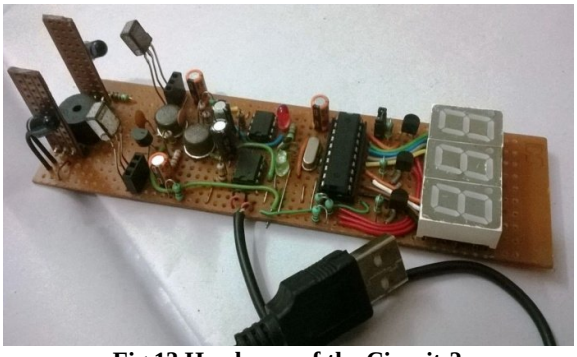

Fig.13 Hardware of the Circuit-2

VII. APPLICATION AND FUTURE SCOPE

This system can be well used in market place or in some closed place like voting are or poll section. This device can be securely used with hiding the sensors also. So, the secret counting may be obtained. It can be used for counting the numbers of traffic if it will be installed on the road or highway, but in that case the sensitivity must be much higher than that of the household or small market place application.

VIII. CONCLUSION

The system proposed in this paper is now under research for the betterment in future interpretation. The most important parts of the system are the remote counting and the frontline security. This two feature makes the system perfect with minimum possibility of theft and moreover the cost will very low as no costly components are used for the construction of the system. The further implementation of the security system will be shown in the next manuscript.

REFERENCES

[1] Ali M. Ashkanani, Ali Sobhy M. Roza, Hadi Naghavipour, "A Design Approach of Automatic Visitor Counting System Using Video Camera", IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE) e-ISSN: 2278-1676,p-ISSN: 2320-3331, Volume 10, Issue 2 Ver. I (Mar – Apr. 2015), PP 62-67

[2] Kadam Shah, Prakash Savaliya and Mitesh Pate,"automatic room light controller with bidirectional visitor counter", ijictrd – international journal of ict research and development ,VOL-1 ISSUE-4 ,ISSN: 2395-4841

[3] Gaurav Waradkar, Hitesh Ramina, Vinay Maitry,Tejasvi Ansurkar, Prof. Mrs. Asha Rawat, Prof. Mr. Parth Das, "Automated Room Light Controller with Visitor Counter",Imperial Journal of Interdisciplinary Research (IJIR),Vol-2, Issue-4, 2016,ISSN: 2454-1362

[4] David Pettebonea,∗, Peter Newmanb,1, Steven R. Lawson, "Estimating visitor use at attraction sites and trailheads in Yosemite National Park using automated visitor counters", D. Pettebone et al. / Landscape and Urban Planning 97 (2010) 229–238

[5] Rahul Mishra1, ShahidRaza2, Zulquarnain3, RachnaArya4, Prashant Kumar, "development of automatic person detection system to control ac fan & room lights", International Journal of Innovative Research in Science, Engineering and Technology,Vol. 2, Issue 3, March 2013

[6] Julian Ross, "Visitor counters in parks: management practice for counter calibration", DEPARTMENT OF CONSERVATION TECHNICAL SERIES 33

[7] Gordon Cessford, Stuart Cockburn, and Murray Douglas, "Developing New Visitor Counters and their Applications for Management", Monitoring and Management of Visitor Flows in Recreational and Protected Areas Conference Proceedings ed by A. Arnberger, C. Brandenburg, A. Muhar, 2002 pages 14-20

[8] Prof. Dr. Subhash P. Rasal, "Implementation of Visiting Counter", International Journal of Emerging Trends in Electrical and Electronics (IJETEE – ISSN: 2320-9569) Vol. 7, Issue. 2, Sep-2013.

[9] Jussi Kuutti *, Kim H. Blomqvist and Raimo E. Sepponen, "Evaluation of Visitor Counting Technologies and Their Energy Saving Potential through Demand-Controlled Ventilation", Energies 2014, 7, 1685-1705; doi:10.3390/en7031685

[10] Rajat shah, Deepak Rasaily, Tashi Rapden Wangchuk, Roshan chettri,Tsheme choden bhutia, "Automatic Room Light Controller with Visitor Counter Desgined using Microcontroller", International Journal of Engineering Trends and Technology (IJETT) – Volume 33 Number 8- March 2016

[11] Gaurav Waradkar, Hitesh Ramina, Vinay Maitry, Tejasvi Ansurkar, Asha Rawat, Parth Das, "Automated Room Light Controller with Visitor Counter", DOI 10.4010/2016.638, ISSN 2321 3361 © 2016 IJESC

[12] Chinnam Sujana, Addanki Purna Ramesh, P.Gopala Reddy, "Automatic detection of human and Energy saving based on Zigbee Communication", International Journal on Computer Science and Engineering (IJCSE), ISSN : 0975-3397, Vol. 3 No. 6 June 2011

[13] m. Rahmat widyanto, ferdi ferandi, martin leonard tangel, "A Visitor Counter System Using Fuzzy Measure Theory and Boosting Method", Wseas Transactions On Information Science And Applications, ISSN: 1790-0832, Issue 1, Volume 7, January 2010

BIOGRAPHIES

Abhishek Dey, born in 1986, is presently Lecturer in Technique Polytechnic Institute with 3 years of teaching experience. He received the B.Tech degree WBUT, India and M.Tech degree from WBUT, India in Electronics and Communication Engineering in 2008 and 2010. His primary research interest includes Digital Signal Processing, Embedded System and Analog Electronics.

Subhadeep Chakraborty, born in 1986, is presently Lecturer in Technique Polytechnic Institute with 5 years of teaching experience. He received the B.Tech degree from Saroj Mohan Institute of Technology, WBUT, India and M.Tech degree from Kalyani Govt. Engineering College, WBUT, India in Electronics and Communication Engineering in 2008 and 2010 respectively. His primary research interest includes Digital Signal Processing, Embedded System and Microprocessor, cloud computing, virtualization of Network and Swarm and Robotics.

Sayed Safikul Islam, presently a student perusing Diploma Degree from Technique Polytechnic Institute in Electronics and Telecommunication Engineering in 3rd Year. His primary interests are Digital Electronics; Signal processing, Embedded System and Microcontroller.

Milan Pramanik, presently a student perusing Diploma Degree from Technique Polytechnic Institute in Electronics and Telecommunication Engineering in 3rd Year. His primary interests are Digital Electronics, Signal processing and Embedded System.

Md. Arafat Hossain Malick, presently a student perusing Diploma Degree from Technique Polytechnic Institute in Electronics and Telecommunication Engineering in 3rd Year. His primary interests are Digital Electronics, Embedded System and Microcontroller.