

Smart Attendance Counting System using IOT and IR sensor

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Abstract-This paper shows a Smart Attendance Counting System dependent on IOT and IR sensor. This Counting framework is intended to count the objects or individuals in places like a classroom, auditorium, workplaces, shopping centers, businesses, and so on. The designed framework can count with the assistance of the Internet of Things(IoT)[1], anybody can remotely screen the presence of people on the premises. The entry and exit of the individual are determined by this framework. It will show the count on a website page which has the remote access to the approved individual. This counting framework can be effectively and financially actualized in every places where the visitors must be counted and controlled.

Index Terms- IOT, IR, counting system.

1. INTRODUCTION

In this paper, the counting system will determine the absolute count value of the object or a person entering or exiting a room or any other closed place where this counting system is installed. This count will be displayed in a web page which has access to the authorized user. The other way of counting the number of objects or people is a manual way, this manual counting system is not an efficient way as it requires more time to record the count at every interval of time and it is also not an accurate way to do so. Automatic attendance and counting system will help in saving time and money by eliminating a great deal of manual processes involved in counting and saves many hours taken for counting. By installing this system in educational institutions will automatically tell the count of number of persons in the classroom by reducing the burden to lecturers. This system is very cost effective as the hardware is very less and is easy to implement also. Other counting systems uses RFID, Biometric and cloud based system which are not cost effective. This new system overcomes all these things and provide accurate results. This counting system can also be used in large crowded areas such as movie theaters, auditoriums, malls, etc.

This system contains two components - IR sensor and Raspberry Pi, One software - FileZilla. Here Raspberry Pi is used as a processor which is coded to count the number of persons entering or exiting with the help of IR sensors. This coding is done by using python programming language. The result is shown in a web page which is development using basic HTML, CSS and JS. The web page is linked to processor with the help of FileZilla software. Here FileZilla will act as an interface between hardware components and web page(software). The count displayed in the web page will have access to the authorized person only and is highly secured.

2. DEFINITIONS

The important definitions are as follows:

2.1. IoT(Internet of Things):

Internet of Things as the name suggests it is the collection of two words "Internet" and "Things"[2]. Internet is a group of networks connected together to provide services across the globe with the help of protocols like TCP/IP. Things - a real world object such as plants, animals, humans, books, vehicles etc. Hence Internet of Things means group of networks which work with the help of real world objects.[2]

2.2. Raspberry Pi:

Raspberry Pi is a low cost mini computer which can be connected to PC as well as television. It acts as a processor for the hardware connected. It is provided with many features like WiFi, keyboard connector and mouse connector. SD card is used to store memory and operating system in a Raspberry Pi. [3]



2.3. IR Sensor:

Infra Red Sensor is a object detection sensor which consists of two components IR LED and IR photodiode. IR LED is used to emit light on a

object and the reflection of the light is captured by IR photodiode which indicates that an object is detected.



2.4. FileZilla:

FileZilla is a free software (open source) FTP(File Transfer Protocol) provider. This is used to transfer files from local PC to remote computer or server.

2.5. Webpage:

Web page is a document developed by using programming languages like HTML(Hyper Text Markup Language), CSS(Cascading Style Sheets). A web page is connected with world wide web and is accessed through a web browser.

3. CLIENT-SERVER ARCHITECTURE

Client- Server architecture is a distributed system in which the clients i.e, mobiles, PC, laptop takes services from servers i.e, super computers, computers which can manage more number of resources through internet.

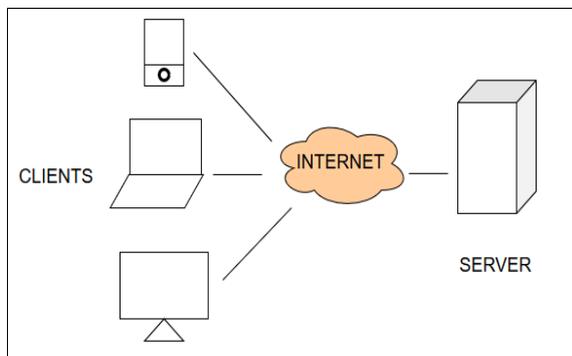


Fig. 1 Client-Server Architecture

4. OVERVIEW

4.1. Existing System:

Attendance recording in a manual way will be inefficient and time taking process. To replace this manual recording other technologies have been developed this include finger-print sensors, retina scan sensors, voice detectors, etc., . This manual recording of attendance is inefficient and time taking process while a technology-based system is quite expensive.

4.2. Proposed System:

It is an automated attendance monitoring system is based on IOT. Both IR sensors are set at the entrance of a classroom to sense the persons who are entering into a classroom. This will increment or decrement the count value accordingly and automatically uploaded into the web page. So, the authorized person can monitor attendance from anywhere at any time.

5. METHODOLOGY

Two infrared (IR) sensors are used for each entry and exit respectively. When the first IR sensor detects, the count value will be incremented and when the second IR sensor detects, the count value will be decremented. Both will get reflected automatically on the web page.

(1) When first IR sensor got interrupted, it gives high input value which increments count value then it should be blocked. Similarly, when the second IR sensor got interruption it should be blocked, it will decrement count value.

(2) The count value will continuously vary from first IR sensor to Second IR sensor regarding their interruption.

(3) At any time authorized user can check the result from the webpage.

6. PROTOCOLS

6.1. HTTP:

HTTP(Hypertext Transfer Protocol) is an application layer protocol used for transferring web pages in the world wide web(WWW). Port number of HTTP is 80. HTTPS is the secure version of HTTP. It is used to provide secure communication over the internet. Port number of HTTPS is 443.

6.2. FTP:

File Transfer Protocol is a network protocol used to exchange files from client to server. Port number of FTP is 21.

7. DESIGN LAYOUT

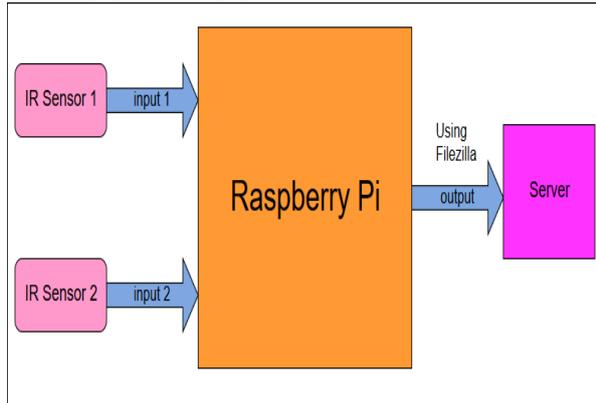


Fig. 2 Design Layout of hardware and software architecture

This layout represents the working architecture of the model. It shows that there are two IR sensors as input and server as output are associated to the raspberry pi. Here the two IR sensors will take the input as count and displays it in the browser using Filezilla software.

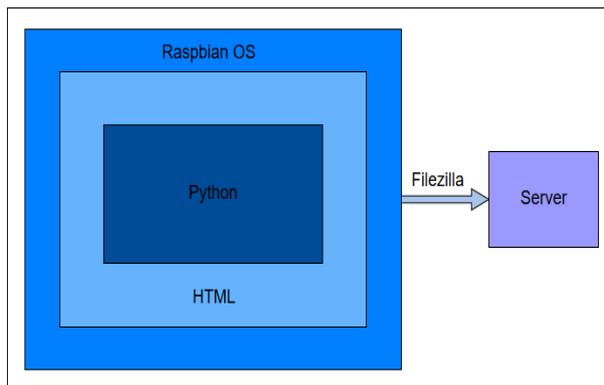


Fig. 3 Design Layout of programming languages and software

This is the basic block diagram of how the Python and HTML code is executed in Raspbian OS and the results are displayed in the browser using filezilla Software.

8. FLOWCHART

This flowchart shows the work flow of the counting system:

- I. Initially the system waits to detect the person or object.
- II. If person or object is detected then it calculates the count corresponding to the entry or exit.
- III. If entered then increment the count, display the count in browser and again wait for the detection.
- IV. If exited then decrement the count, display the count in browser and again wait for detection.
- V. This is a continuous process.

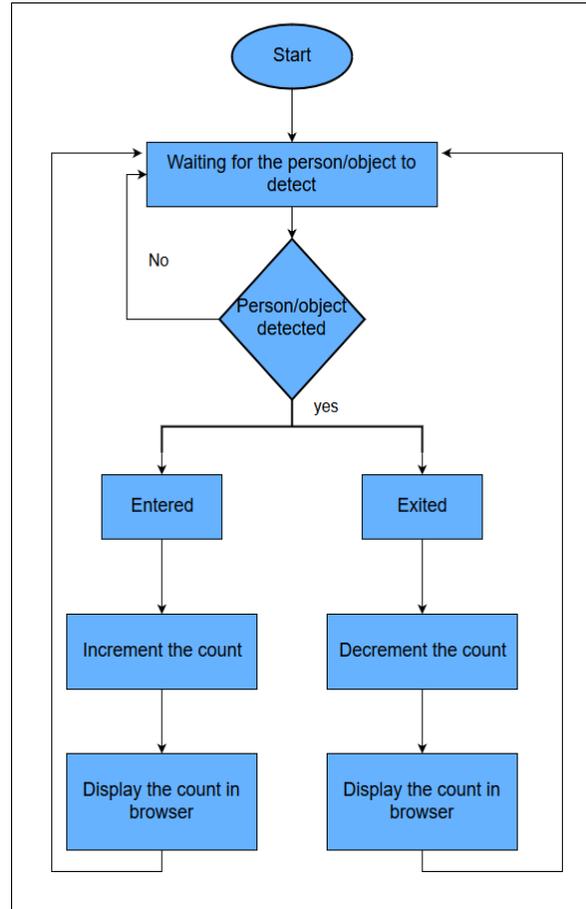


Fig. 4 Flowchart of the counting system

9. RESULTS

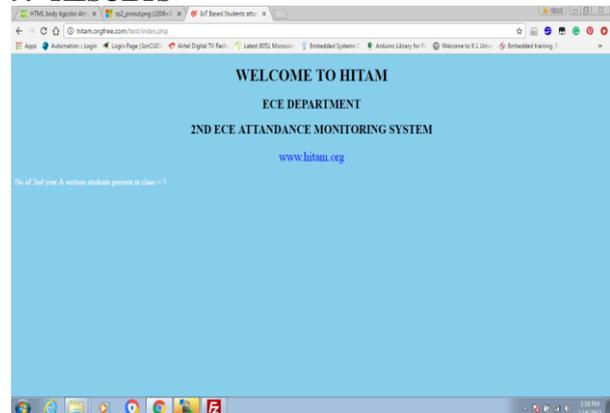


Fig. 5 A web page displaying the count

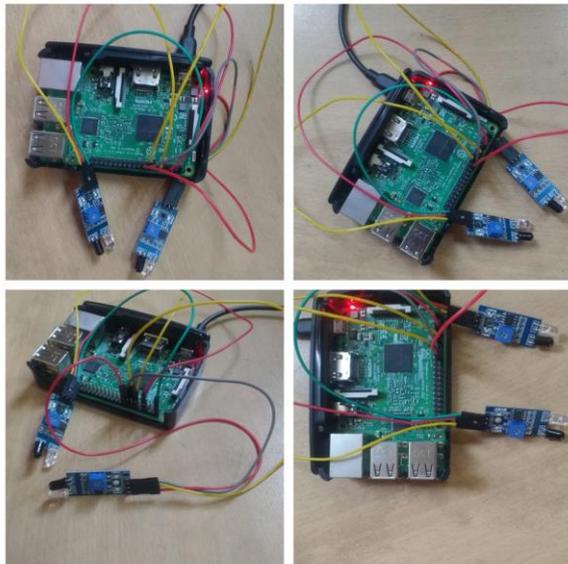


Fig. 6 Raspberry pi and IR sensors connections

http://file.scirp.org/pdf/JCC_2015052516013923.pdf

- [3] Prof B.P Kulkarni; Aniket V Joshi; Vaibhav V Jadhav; Akshaykumar T Dhamange (2017): IoT Based Home Automation Using RaspberryPI , <http://ijisset.org/wp-content/uploads/2017/04/IJISSET-030406.pdf>

10. CHARACTERISTICS

1. Attendance can easily uploaded into web page.
2. This System is user-friendly, this can be accessed from anywhere at any time.
3. Manual work of attendance can be eliminated.
4. This system is very cost effective.

11. APPLICATIONS

The proposed SMART ATTENDANCE SYSTEM has a wide range of applications. Some of them are as follows:

- i. To count the visitors of an auditorium, cinema theaters, offices, malls, etc.
- ii. In Parking Lot.
- iii. In an elevator to avoid maximum limit of weight.

12. CONCLUSION

This project determines the real time attendance monitoring and counting system. It computes the number of persons going into or leaving the room and displays it in the web page. The count value will increment when a person is entered and is displayed in the web page and when the person exits the count will be decremented and is displayed in the web page. The access to the web page is given to authorized persons only. Future enhancements of this project are replacing IR sensor with ultrasonic sensor and displaying the count along with the Time Stamp.

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