Room Occupancy Analyzer System

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ABSTRACT

With the Coronavirus pandemic still very much a problem, practicing social distancing and staying away from others is especially important. However, this is difficult to do in enclosed and crowded areas. Here is where the Room Occupancy Counter can help. It keeps track of the number of people in a room or building by increasing a counter when people enter and decreasing the counter when people leave. Once the number of people in an area surpasses the maximum number of people allowed (which can be set by the user), an alarm will go off until the number of people is within bounds again.This can prevent buildings and rooms from being over crowded, which can help to limit the virus's spread by making social distancing easier to practice.A people counter is an electronic device that is used to measure the number of people traversing a certain passage or entrance. Examples include simple manual clickers, smart-flooring technologies, infrared beams, thermal imaging systems, Wi-Fi trackers and video counters using advanced machine learning algorithms. They are commonly used by retail establishments to judge the effectiveness of marketing campaigns, building design and layout, and the popularity of particular brands.

Keywords— Room Counter, Class Monitor, Accupancy Analyzer, Room Accupancy Counter.

Introduction

Automated counter system is an efficient solution for counting the number of people entering or leaving a room. This paper attempts to provide a unique solution which can automatically count the number of people. It intelligently discovers and counts the number of people with the help of internal code from the Arduino UNO. This has been achieved by using an Infrared sensor, piezoelectric sensors and the development board Arduino UNO. Two Infrared sensors are placed at entry and exit of a room. The system requires low voltage and minimum maintenance to continue the operation.

A series of piezoelectric sensors are placed under a mat between the two infrared sensors. The sensors acquire the data and sends to the arduino which maintains the count.

In recent times, counting visitors has become an essential task for people working in sectors which include customers where the number is used as a satisfaction tool by the administrators. Hence, people began researching methods to count people efficiently without hindrance. The objective of this paper is to provide a suitable solution for counting people in an office or a place where the intensity of people is moderate to high The primary method of counting visitors include hiring people to stand and manually count the number of guests or workers who enter or exit from the venue or location

Literature Review

Traceability in Counter International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 7, Issue 3, March 2018,A Survey on Bidirectional Visitor Counter with Automaticlight and Fan Control for Room

Processor Used

The Nano Every is an Original Arduino's 5V compatible board in the smallest available form factor: 45x18mm! The Arduino Nano Every is an evolution of the traditional Arduino Nano board but features a lot more powerful processor, the ATMega4089. This will allow you to make larger programs than with the Arduino Uno (it has 50% more program memory), and with a lot more variables (the RAM is 200% bigger).

LED_BUILTIN	13
Architecture	AVR
Clock Speed	20 MHz
DC Current per I/O Pin (mA)	20mA

Flash Memory	48 KB
EEPROM 256byte (ATMega4809)	
SRAM (KB)	6
Weight (gm)	5
Length (mm)	45
Width (mm)	18
Height (mm)	6
Shipment Weight	0.02 kg
Shipment Dimensions	6 × 5 × 3 cm

Proposed System Model
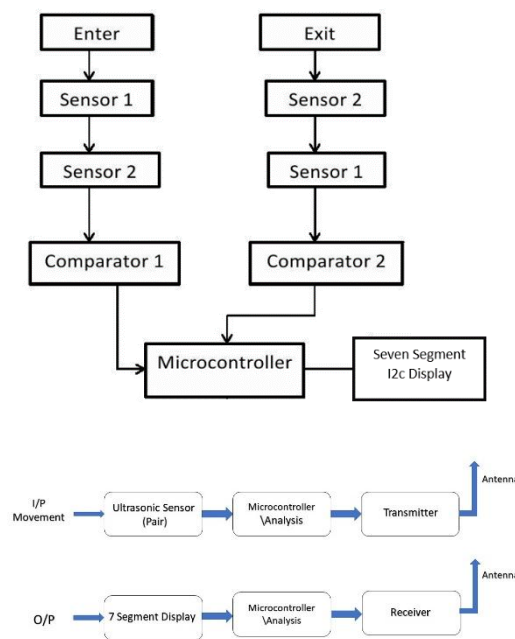
For counting and measuring the distance we made two methods: measureDistance() and calculateDistance(). We set The Particular Distance (Depend on the Door Size). The Sensor Attached at a point that can Detect the person who is Passes from door or not.The all Sensor Are Connected to the main Machine which is present at HOD Room Where is Monitoring the labs. These sensors signals are transmits in encrypted way. For Transmission We are using NRF module.
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Methodology

When a person enters and passes through the get or door the weight of the person which is in the form of external stress to the piezoelectric sensor is converted into an electrical signal The counter system is designed to detect the number of visit or entering or leaving the room.The first IR sensor which is programmed to detect the entry of a person is placed on the exit side of the door .The system consists of a sensor that detect person and then count that person in . The IR sensor which is programmed to detect the exit of a person is placed on the entry side of the door.

Result and Comparative Study

This paper has the research objective of investigating the possibility of room ocupancy counter implementation. The cornerstone in the development of traceability solutions avoids to much croud in public offices In the earlier research,this type of room ocupancy counter. So in the offices or in banks or in classsrooms, the roomocupancy counter can be used. and now adaybcause of the covidpandamic the use of such a product must be increased in a wide scope.
Here is where the Room Occupancy Counter can help. It keeps track of the number of people in a room or building by increasing a counter when people enter and decreasing the counter when people leave. Once the number of people in an area surpasses the maximum number of people allowed (which can be set by the user), an alarm will go off until the number of people is within bounds again. This can prevent buildings and rooms from being over crowded, which can help to limit the virus's spread by making social distancing easier to practice.

Conclusion

We conclude that this device can help to count people in a room. this device can display the number of persons in a room.

Implementation Details

Implementation of Arduino-based Counter System :- Two Infrared sensors are placed at entry and exit of a room.A series of piezoelectric sensors are placed under a mat between the two infrared sensors.The sensors acquire the data and sends to the arduino which maintains the count. This paper attempts to provide a unique solution which can automatically count the number of people. It intelligently discovers and counts the number of people with the help of internal code from the Arduino UNO The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The HC-SR04 ultrasonic sensor uses sonar to determine the distance to an object like bats or dolphins do.

This Ultrasonic Sensor module is a transmitter, a receiver and a control circuit in one single pack!! It has very handy and compact construction. It offers excellent range accuracy and stable readings in an easy-to-use package. TM1637 4 Bits Digital Tube LED Display Module is an affordable solution for displaying the output data of your Arduinoo project. Though the data displayed is restricted by numbers still it allows users to display some characters too like A, B, C etc.

This 7 segment LED Display has 4 digits which are controlled by TM1637 Driver Chip. It requires only two connections to control this TM1637 4 Bits Digital Tube LED Display Module. Also thanks to the I2C Bus you can control it using only 2 wires, leaving more pins available on your MicroController to connect other things.

LIMITATIONS OF EXISTING SYSTEM

The existing system is mostly used in college or office domain for counting students or people . the sensor used in this project is an ultasonic sensor which has some limitations in it like limited testing distance, inaccurate readings, and inflexible scanning methods. and it has some disadvatages like Lack of native connectivity limits possible Internet of Things (IoT) uses and Limited on board memory can make complex programs difficult.also we used the segment which has some drawbacks like limited characters: Seven-segment displays are capable to display only numbers from 0-9 and few alphabets.
Type of display: The appearance of the two types of display are very similar and that causes difficulty interfacing it with controllers . nad for such improvement in our project we neeed add our budget in project also and which makes our project more expensive

FUTURE WORK

1. In future this device can be connected with a relay to control appliances.
2. In future we can install this in covid-19 special a ward for contactless person counting.

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