**MOTION COUNTER**

**Introduction**

A Bi-Directional person / object counter is a device which can be used to monitor the number of objects entering / exiting through it. It has a wide range of applications including automatic parking slots monitoring, number of people entering / exiting a mall , number of students in a class , et cetera.

The distance from the object is very important and in some cases the IR sensor is not suitable for these applications. If the distance from the object is greater than 20-30cm, the ultrasonic sensor can be a better choice.

**Why did we decide to make this project?**

The project provides an effective and efficient way of counting people or objects entering or leaving a particular area. Since this work is done with the help of electronic sensors, chances of human error are reduced and accuracy increases.

**Materials and Methods**

**Components Used:**

* Hardware:

|  |  |  |  |
| --- | --- | --- | --- |
| S. No. | Component | Picture | Description |
|  | Arduino Uno Board | https://lh3.googleusercontent.com/g8NQnb2cVwsiBM2AlOEJIci8Y3gDUs_1tsxaNMI-hL1ZgjjoYHfy5VYvkvBbXecVCQl0FZ5C_xeHB185XfxYjDfRaPcsC2cc5KW_Dgu3X659OL_o3TeFsRcrp033nu48wQ | It is a microcontroller board based on the Atmega328P. It has 14 digital input/output pins, 6 analog inputs, a 16 Mhz quartz crystal, a USB connection, a power jack and a reset button. |
|  | IR Sensor | Image result for ir sensor | An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. |
|  | LCD Display | Image result for lcd display | **LCD** (**liquid crystal display**) is the technology used for**displays** in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow **displays** to be much thinner than cathode ray tube (CRT) technology. |
|  | Jumper Wires | Image result for jumper wires |  |

* Software:

1. Arduino IDE:

It contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino to upload programs and communicate with them.

1. Fritzing:

Fritzing is an open source hardware initiative that makes electronics accessible as a creative material for anyone. It is a software tool and community website for processing and Arduino, fostering a creative ecosystem which allows users to document their prototypes, share them with others, and manufacture professional PCB’s.

**Method**

* Our project is a simple objects counter based on Arduino and two IR sensors. More in details, it is a 0 to 9 counter in which the first sensor is used to count ingoing people, the second those outgoing. The difference (IN – OUT) is shown on a LCD display.
* This proposed demo counts non-transparent objects which are traversing two IR gate: the first gate produce an increment on a total counter, the second produce a decrement. Since our simple demo uses a one digit display our application checks that two things have occurred:
* The counting must not be represented by a negative number;
* The counting must not be represented by a number greater than 9.
* The count is kept by the program uploaded in Arduino IDE.
* When the maximum limit (10 people, in our case) is exceeded, a warning message is displayed on the LCD screen.

**Schematic**

**Cad Model**

**Future scope**

The counter application is often used for:

* Counting people traversing a certain passage or entrance. For example, in commercial buildings there are gates which control user access or presence often used to optimize energy consumption;
* This infrared object counter can be installed at the entry gate to count the total number of people entering any venue. For example, it can be used at the railway stations or bus stands to count the people arriving per day or week.
* counting objects or merchandise in industrial sector;
* etc.

A counter can be made not only with IR technology but also with thermal imaging systems that use an array of sensors which detect heat sources or using machine vision which usually requires complex image processing algorithms.