upSkill CAMPUS

Pacific School of Engineering, Surat
affiliated with GTU

A
Report
on

(Object Counter System)

Submitted by:-

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Abstract

Object counter system is an efficient solution for counting the number of people, object , anything can count. This paper attempts to provide a unique solution which can automatically count the number of Object. It intelligently counts the number of object with the help of internal code from the Arduino UNO. This has been achieved by using an ***IR sensor, LDR sensor, Arduino, OLED (SSD1306)*** *and the development. A series The sensors acquire the data and sends to the Arduino which maintains the count. The system requires low voltage and minimum maintenance to continue the operation*.

INTRODUCTION

Object Counter System:-

We are in a world of digital transformation. In every aspect technology is one common thing people depend upon. If we look back in the 1970s, people used to count objects manually by counting. But today we can see that many methods have been introduced to count object without the need of any human presence. The sensors and cameras will simplify our job of counting the people. We just need to program them to perform the required task.

In recent times, counting object 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. Since then many methods have been introduced which are now used in various sectors around the world. However, there are certain disadvantages with every method and it is up to the administrators to decide the best method to count object.

One method might be efficacious but extremely expensive. Another one can be quite feasible and cheap but not efficient. The objective of this paper is to provide a suitable solution for counting object in any where the intensity of people is moderate to high.

The solution used basic sensors such as *an* **IR sensor, LDR sensor, Arduino, OLED (SSD1306*)*** and are programmed using a development board called Arduino.

OBJECT COUNTER SYSTEM

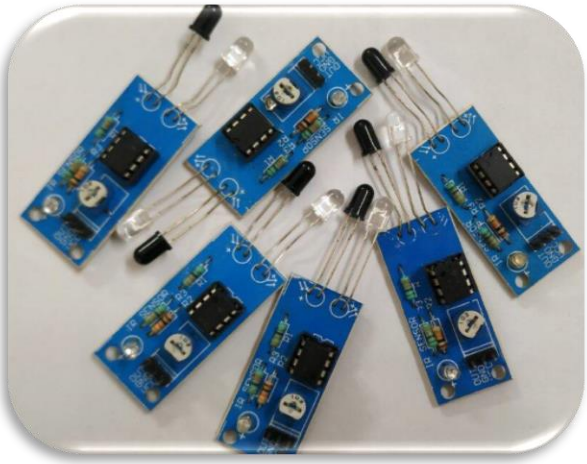
AIM:- To automatically count the object and monitor the count for display.

Component and Devices:-

- IR sensor
- LDR sensor
- Arduino
- OLED (SSD1306)
- Jumper wires
- Breadboard
- A Potentiometer
- USB cable for uploading the code

IR sensor:-

The IR sensor emits and receives infrared rays in order to detect the object near it. Usually, in the infrared spectrum, all objects radiate some form of thermal radiation which is not detected by human eyes but an IR sensor can detect it.

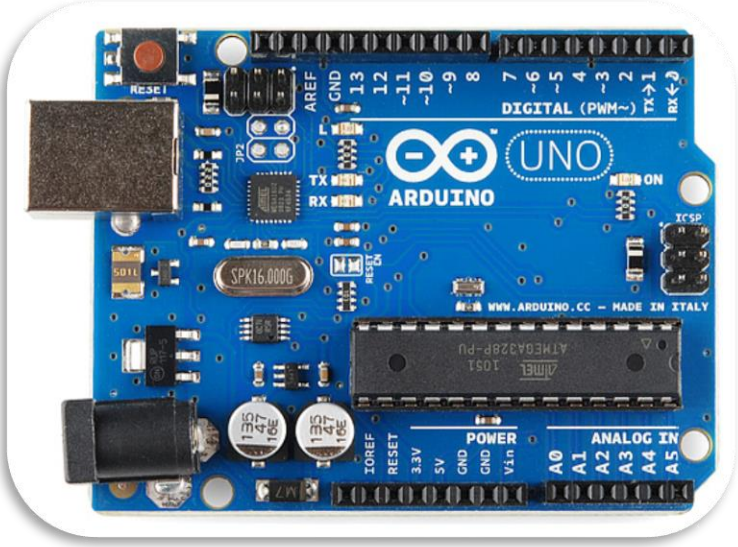


IR sensor

Arduino:-

Arduino is a project, open-source hardware, and software platform used to design and build electronic devices. It designs and manufactures microcontroller kits and single-board interfaces for building electronics projects.

The Arduino board consists of sets of analog and digital I/O (Input / Output) pins, which are further interfaced to **breadboard, expansion boards,** and other **circuits**. Such boards feature the model, Universal Serial Bus (**USB**), and **serial communication interfaces**, which are used for loading programs from the computers.



Arduino

OLED (SSD1306):-

The SSD1306 display is an organic light emitting diode (OLED) device that is great for small-scale Arduino, Raspberry Pi, and Raspberry Pi Pico projects that involve real-time data acquisition, communication, and debugging.

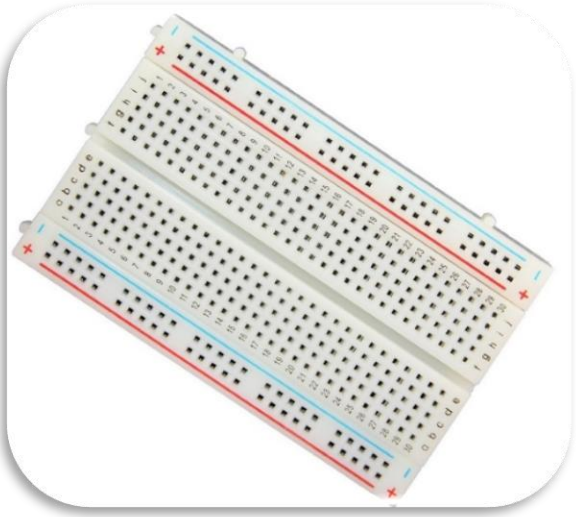
OLED

USB cable:-

USB cable

Breadboard:-

The breadboard is a white rectangular board with small embedded holes to insert electronic components. It is commonly used in electronics projects. We can also say that breadboard is a prototype that acts as a construction base of electronics.



Breadboard

Working Principle:-

1. This project counts the number of object that pass in front of the IR sensor in one direction only. The value of the total counts or the count number is displayed OLED (SSD1306).
2. The module has an emitter which is an IR sensor and a detector which is an IR photodiode. The IR sensor that we are using in this project is an active IR sensor. Whenever it detects an object inside its range the output generated by it is high otherwise the output is low. You can also adjust the range of the sensor by rotating the inbuilt trim pot. The count is zero initially and then incremented by one whenever something passes in front of it.

Advantages:-

1. Real-time Data: An object counter system provides real-time data on the count and movement of objects. This enables businesses to monitor and respond to changes promptly, leading to better decision-making and improved operational efficiency.
2. Accurate and Automated: IoT-based object counters are generally more accurate than manual counting methods. They eliminate human errors and can count objects with greater precision. Additionally, the system can operate continuously without the need for manual intervention.
3. Cost-effective: Implementing an IoT object counter system can be cost-effective in the long run. Once the system is set up, it can operate autonomously, reducing the need for manual labor and associated costs. It also eliminates the need for physical counters or manual tallying, saving time and effort.
4. Scalability: IoT systems are scalable, allowing businesses to easily expand and adapt the object counter system to different locations or areas. Additional sensors can be deployed, and the system can be integrated with other IoT devices or platforms for more comprehensive monitoring and analysis.

Disadvantages:

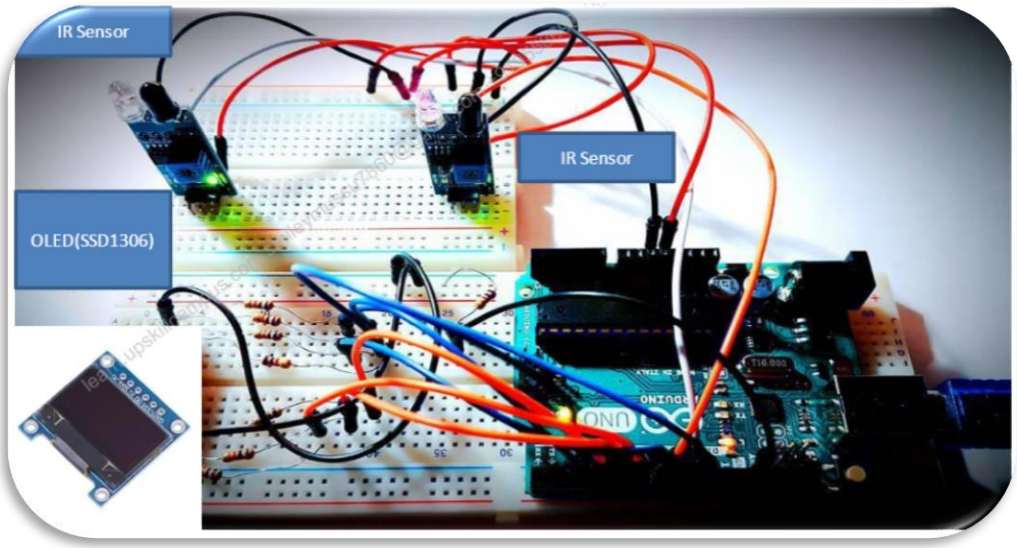
1. Initial Setup and Maintenance: Setting up an object counter system can require technical expertise, especially for configuring the sensors, microcontroller, and connectivity components. Ongoing maintenance and troubleshooting may also be necessary to ensure proper functioning of the system.
2. Sensor Limitations: Different types of sensors have specific limitations. For example, infrared sensors may have difficulty distinguishing between closely spaced objects or objects of similar temperature. Ultrasonic sensors may have challenges detecting objects with certain shapes or materials. It's important to carefully select sensors suitable for the specific application to minimize potential limitations.
3. Connectivity Reliability: The object counter system relies on stable internet connectivity to transmit data to the cloud or server. If the network connection is weak or disrupted, it can affect the accuracy and timeliness of the data. Implementing backup connectivity options or redundancy measures can help mitigate this risk.
4. Privacy and Security Concerns: IoT devices are susceptible to security threats and privacy breaches. Object counter systems collect data about object movement, which may include personal information or sensitive business data. Ensuring appropriate security measures, such as encryption, access control, and data anonymization, is crucial to protect the collected data and maintain user privacy.

Application:-

1. Object counter on conveyer belt (Railway station, Airport and Metro Station), ASPS (Automated Storage And Retrieval System) in industries.
2. Retail Stores: Object counter systems are commonly used in retail stores to track the number of people entering and exiting the premises. This information can help store owners optimize staffing levels, measure foot traffic, and analyze customer behaviour to improve store layout and product placement.
3. Traffic Monitoring: Object counters can be deployed in roadways or intersections to count and track vehicles. This data can be used for traffic analysis, optimizing traffic signal timing, and identifying congested

areas. It can also assist in intelligent transportation systems and urban planning.

4. Parking Lots: Object counter systems can be used in parking lots to monitor the occupancy of parking spaces. By providing real-time information on available parking spaces, drivers can save time and reduce congestion by quickly locating an empty spot. It also helps parking lot operators manage capacity and implement dynamic pricing strategies.
5. Industrial Automation: In manufacturing and logistics settings, object counter systems can track the movement of goods, inventory, and assets. This enables efficient inventory management, automated stock replenishment, and optimization of production processes.
6. Libraries and Study Spaces: Object counters can be employed in libraries and study areas to monitor the usage of seats or study desks. This helps in resource allocation and optimizing space utilization.
7. Public Transportation: Object counter systems can be integrated into buses, trains, or subway stations to count passengers and monitor ridership. This data assists transportation authorities in planning schedules, optimizing routes, and evaluating service demand.



object counter system