LIVE PEOPLE COUNTER

A MINOR PROJECT - II REPORT

Submitted by

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BACHELOR OF ENGINEERING

in

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous)

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BONAFIDE CERTIFICATE

Certified that this **18ECP104L - Minor Project II** report "**LIVE PEOPLE COUNTER"**is the bonafide work of "**ARUN KUMAR D(927621BEC014), GOWTHAMVEL P(927621BEC054),HARIPRASAATH S(927621BEC058), KIRAN KUMAR S(927621BEC304)**who carried out the project work under my supervision in the academic year **2022-2023 - EVEN**.

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This Minor project-III report has been submitted for the **18ECP104L – Minor Project-II** Review held at M. Kumarasamy College of Engineering, Karur on **Final Review Date (DD-MM-YYYY) .**

PROJECT COORDINATOR

INSTITUTION VISION AND MISSION

Vision

To emerge as a leader among the top institutions in the field of technical education.

Mission

M1: Produce smart technocrats with empirical knowledge who can surmount the global challenges.

M2: Create a diverse, fully -engaged, learner -centric campus environment to provide quality education to the students.

M3: Maintain mutually beneficial partnerships with our alumni, industry and professional associations

DEPARTMENT VISION, MISSION, PEO, PO AND PSO

Vision

To empower the Electronics and Communication Engineering students with emerging technologies, professionalism, innovative research and social responsibility.

Mission

M1: Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects.

M2: Inculcate the students in problem solving and lifelong learning ability.

M3: Provide entrepreneurial skills and leadership qualities.

M4: Render the technical knowledge and skills of faculty members.

Program Educational Objectives

PEO1: **Core Competence:** Graduates will have a successful career in academia or industry associated with Electronics and Communication Engineering

PEO2: **Professionalism:** Graduates will provide feasible solutions for the challenging problems through comprehensive research and innovation in the allied areas of Electronics and Communication Engineering.

PEO3: **Lifelong Learning:** Graduates will contribute to the social needs through lifelong learning, practicing professional ethics and leadership quality

Program Outcomes

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

<u>**Program Specific Outcomes**</u>

PSO1: Applying knowledge in various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of Engineering application.

PSO2: Able to solve complex problems in Electronics and Communication Engineering with analytical and managerial skills either independently or in team using latest hardware and software tools to fulfil the industrial expectations.

Abstract	**Matching with POs, PSOs**
Arduino Nano,Live Counter,People,Infrared Sensor	**PO1, PO2, PO3, PO5, PO8, PO10**

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ABSTRACT

The system is designed for optimum energy usage and is very beneficial in case if we want to count the number of people going to attend a particular event or any function thereby helps in collecting data by counting the number of people.This is done by simply incrementing(also decrementing) the counter. The system uses InfraRed Sensor pairs in order to fulfil this purpose and thus saves a large amount of energy. Each pair consists of 2 sensor pairs placed at a certain distance from one another in the opposite direction. The IR transmitter is used to transmit IR rays straight to the receiver which receives the input and feeds this to an Arduino nano Microcontroller. As soon as a person enters the area where the system is placed, it is detected by the IR sensor module and this info is fed to the microcontroller. The microcontroller process this input received. At this time the system also counts the number of people present and increments a counter on each arrival, this count is displayed on a LCD display.

Keywords: *Arduino Nano,Live Counter,People,Infrared Sensor*

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LIST OF ABBREVIATIONS

ACRONYM	ABBREVIATION
LCD	Common Language Specification Liquid Crystal Display
IR	Central Processing Unit Infrared
USB	Universal Serial Bus
I/O	Input/Output
UART	Universal Asynchronous Receive And Transfer
IDE	Integrated Development Environment
TX	Transfer
RX	Receive
PWM	Pulse Width Modulation
LED	Light Emitting Diode
DC	Direct Current

CHAPTER 1

INTRODUCTION

The project aims to design and develop a system that can accurately count the number of people attending a particular event or function. This system will help in collecting data on the number of people present at any given time by simply incrementing or decrementing the counter as people enter or leave the venue. The system is equipped with infrared sensors that can detect the presence of people and update the count accordingly. The count is displayed on an LCD display for easy visibility and tracking.

This system can be implemented in various public places like malls, marriage halls, offices, colleges, and more, where it is essential to know the exact number of people present at any given time. The system is designed to be efficient, accurate, and easy to use, making it an ideal solution for managing crowds and tracking attendance.

CHAPTER 2

LITERATURE REVIEW

1. "Design and implementation of a bidirectional people counter using infrared sensors" by P. R. P. Neves, R. P. H. Miranda, and E. C. R. Silva. This study proposes a bidirectional people counter using IR sensors and evaluates its performance in a real-world environment. The system achieved an accuracy of 97% and a counting speed of up to 30 people per second.

2. "A novel bidirectional people counting system using infrared sensors and neural networks" by J. Zhao, X. Chen, and H. Wang. This study presents a bidirectional people counting system using IR sensors and neural networks. The proposed system achieved an accuracy of over 98% and can count up to 40 people per second.

3. "Real-time people counting using an IR sensor array" by T. Zhang, K. Wei, and Y. Cheng. This study proposes a real-time people counting system using an IR sensor array. The system achieved an accuracy of over 95% and can count up to 20 people per second.

CHAPTER 3

EXISTING SYSTEM

3.1V-COUNT

This is a people counting system that uses IR sensors to provide accurate data on foot traffic in a variety of settings. The system offers bidirectional counting and real-time data, as well as advanced analytics and reporting features.

It's important to note that while these systems may offer similar functionality to the proposed project, they may differ in terms of their specific hardware and software components, as well as their accuracy and reliability.

One of the key advantages of the V-Count system is its accuracy. The stereo vision sensors are able to detect people even in challenging lighting conditions, such as low light or shadows, and the advanced algorithms are able to accurately distinguish between people and other objects, such as shopping carts or strollers.

CHAPTER 4

PROPOSED SYSTEM

4.1 LIVE PEOPLE COUNTER

The proposed system for live people counting using IR sensors and bidirectional capabilities involves the use of IR sensor pairs, an Arduino nano Microcontroller, and an LCD display. The system is designed to count the number of people entering and exiting a particular area, such as an event or function, and increment or decrement the counter accordingly.The microcontroller processes the input received from the IR sensor pairs and updates the counter by incrementing or decrementing it based on whether the person is entering or exiting the area. The count is then displayed on an LCD display in real-time.

Overall, the proposed system provides an efficient and cost-effective solution for live people counting in a variety of settings. However, it is important to ensure that the system is calibrated correctly and that the IR sensor pairs are placed in optimal locations to ensure accurate data collection.

4.2 TOOLS USED

- ARDUINO NANO
- INFRARED SENSOR
- BUZZER
- RELAY
- LCD DISPLAY

4.3 BLOCK DIAGRAM

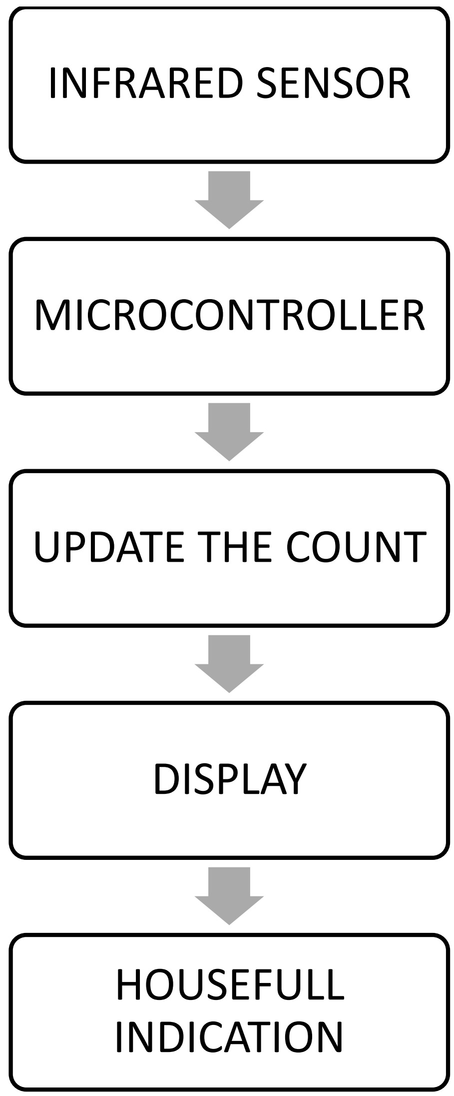

Figure 4.3.1 :Block diagram

4.4 **CIRCUIT DIAGRAM**

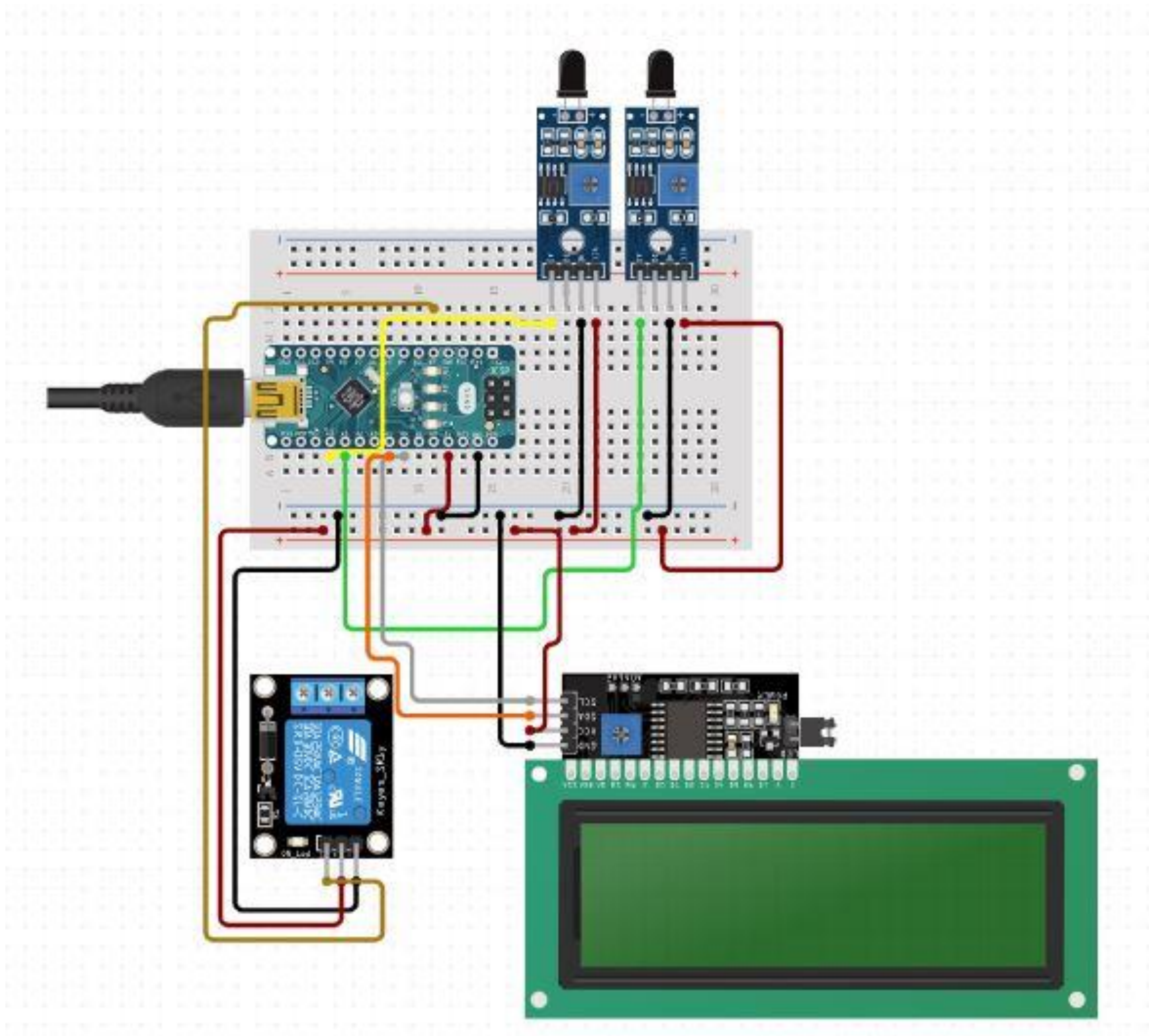

Figure 4.4.1 :Schematic diagram

CHAPTER 5

COMPONENTS REQUIRED

5.1 MICROCONTROLLER (ATMEGA328P) ARDUINO NANO

The Arduino nano is an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE , via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX).

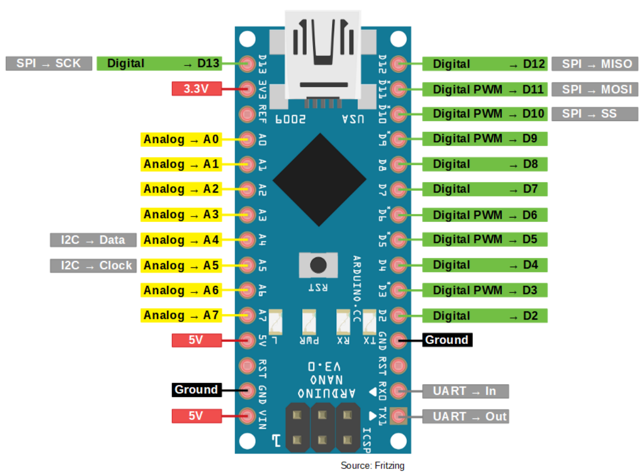

Figure 5.1.1 :ARDUINO NANO (ATMEGA328P)

5.2 INFRARED SENSOR

Active infrared sensors both emit and detect infrared radiation. Active IR sensors have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver.

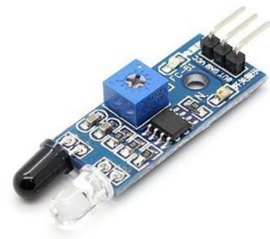

Figure 5.2.1 :INFRARED SENSOR

5.3 RELAY

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal.

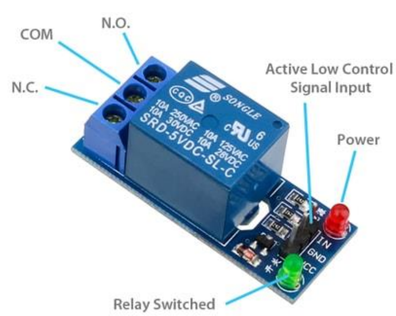

Figure 5.3.1:Relay Module

5.4 LCD DISPLAY

This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports.

Specifications

- Operating Voltage: 4.7V to 5.3V.

- Can display (16x2) 32 Alphanumeric Characters.
- Custom Characters Support.
- Works in both 8-bit and 4-bit Mode.

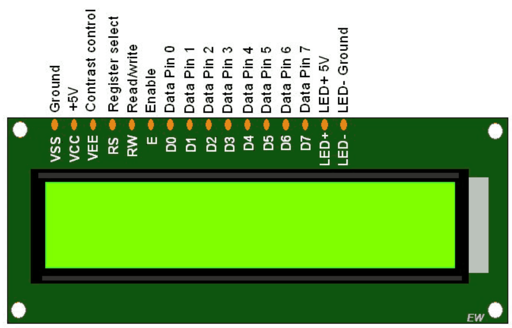

Figure 5.4.1 : LCD DISPLAY(16x2)

5.5 BUZZER

Buzzer is a device which uses sound to indicate the user.It is controlled by the microcontroller Arduino nano.When the digital pin is HIGH to the Buzzer .The Buzzer is activated and it creates the sound and Indicates the user.

SPECIFICATIONS

- The frequency range is 3,300Hz.
- Operating Temperature ranges from – 20° C to +60°C.
- Operating voltage ranges from 3V to 24V DC.
- The sound pressure level is 85dBA or 10cm.
- The supply current is below 15mA.

Figure 5.5.1 :Buzzer

CHAPTER 6

EXPERIMENT PROCESS

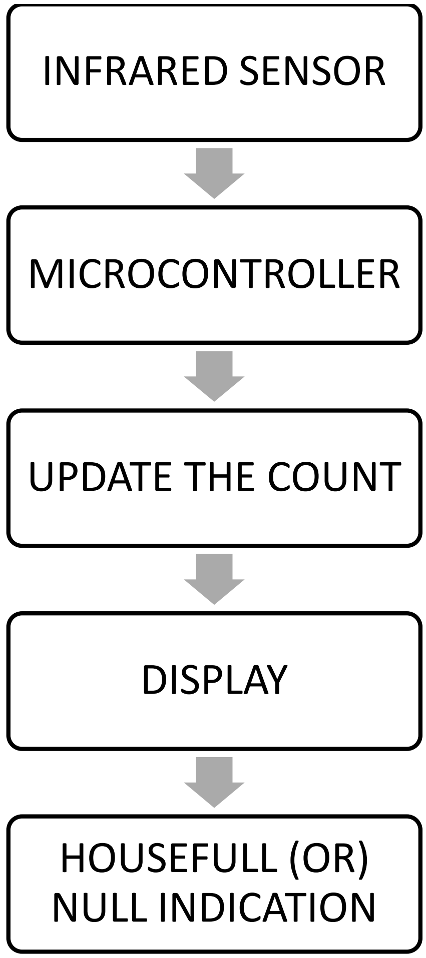

Fig 6.1: Block Diagram

The proposed system for live people counting using bidirectional IR sensors involves using two IR sensors placed at a certain distance from one another in opposite directions. When a person passes through the sensors, the system detects the movement and processes it using an Arduino nano microcontroller. The system uses a flag variable to keep track of whether the person is entering or exiting the room or hall.

6.1 CASE1:

Fig 6.1.1 : Illustration of a person entering a room

The proposed system for live people counting using bidirectional IR sensors involves using two IR sensors placed at a certain distance from one another in opposite directions. When a person passes through the sensors, the system detects the movement and processes it using an Arduino nano microcontroller. The system uses a flag variable to keep track of whether the person is entering or exiting the room or hall.

In the first case, when a person enters the room or hall, the system detects the person's movement through the two sensors. The first sensor detects the person's movement, and the system increments the first variable by 1. The second sensor then detects the person, and the system increments the second variable. The flag variable is set to 2 initially since the first sensor detects the person first. The system then decrements the flag variable by 1 when the second sensor detects the person. After the flag variable is reset to 0, the system increments the total count of people inside the room or hall.

6..2 CASE 2:

Fig 6.2.1: Illustration of a person exiting a room

In the second case, when a person exits the room or hall, the system detects the person's movement through the two sensors. The second sensor detects the person's movement, and the system increments the first variable by 1. The flag variable is set to -2 initially since the second sensor detects the person first. The first sensor then detects the person, and the system increments the second variable. The system then increments the flag variable by 1 when the first sensor detects the person. After the flag variable is reset to 0, the system decrements the total count of people inside the room or hall.

Finally, the count of people inside the room or hall is displayed on an LCD display. If the count is 0, the system automatically turns off the electrical appliances in the room or hall to save energy.

6.3 SOURCE CODE:

```
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 2, 1, 0, 4, 5, 6, 7, 3, POSITIVE);
#define sensorPin1 7
#define sensorPin2 8
#define relay 3
int sensorState1 = 0;
int sensorState2 = 0;
int count=0;

void setup()
{
  pinMode (sensorPin1,
INPUT_PULLUP);
  pinMode (sensorPin2, INPUT_PULLUP);
  pinMode(relay, OUTPUT);

  lcd.begin(16,2);
  lcd.backlight();
  lcd.setCursor(4,0);
  lcd.print("COUNTER");
   lcd.setCursor(0,1);
  lcd.print("No Visitors     ");
  delay(200);
}

void loop()
{
  sensorState1 = digitalRead(sensorPin1);
  sensorState2 = digitalRead(sensorPin2);

  if(sensorState1 == LOW){
    count++;
    delay(500);
```

```
}

if(sensorState2 == LOW){
  count--;
  delay(500);
}


 if(count<=0)
{
  digitalWrite(relay, LOW);
  lcd.setCursor(0,1);
  lcd.print("No visitors    ");
}
else if (count>0 && count<100){
  digitalWrite(relay, HIGH);
  lcd.setCursor(0,1);
  lcd.print("Visitors:   ");
  lcd.setCursor(12,1);
  lcd.print(count);
  lcd.setCursor(13,1);
  lcd.print("  ");

}
else {
  digitalWrite(relay, HIGH);
  lcd.setCursor(0,1);
  lcd.print("Visitors:   ");
  lcd.setCursor(12,1);
  lcd.print(count);   } }
```

CHAPTER 7

RESULT AND DISCUSSION

As per the project description, the system for counting the number of people attending an event or function has been successfully implemented. The system uses a counter that is incremented (or decremented) whenever a person enters or exits the venue. The count is displayed on an LCD display.

This system is beneficial for collecting data regarding the number of people attending an event or function. The data can be used for various purposes, such as estimating the capacity of the venue, analyzing the attendance pattern, etc. The system can be used in public places like malls, marriage halls, offices, colleges, etc., where it is necessary to know the exact number of people inside the premises accurately and efficiently.

During the implementation of the system, certain challenges may arise, such as sensor malfunction, interference from external factors like sunlight, shadows, etc. Proper calibration and placement of the sensors can minimize these challenges. Also, the system should be periodically checked and maintained to ensure its smooth functioning.

Overall, the system can be a useful tool for gathering accurate data on the number of people present at an event or venue. With proper implementation and maintenance, the system can provide valuable insights and aid in decision-making processes.

CHAPTER 8

CONCLUSION

In conclusion, the project of counting the number of people attending an event or function is an important and useful application in various public places. With the implementation of this system, accurate data can be collected on the number of people present, which can be helpful in many ways such as for security purposes, crowd management, and resource allocation.

The system is easy to use and efficient, and the LCD display provides a clear and visible count of the number of people present. Overall, this project can be a valuable addition to public places like malls, marriage halls, offices, colleges, and other similar areas.

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OUTCOME

<<Conference Proceding Abstract / Journal Paper (First Page) / Participation Certificate with Project Title / Patent>>