IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Smart Entry Counter

[1]Prof.Varshitha N Gowda, [2]Lavanya M, [3]Harshitha B R, [4]Koushil R Gowda, [5]Lokesh C M

[1]Assistant Professor, [2,3,4,5]Student,

[1,2]Department of Electrical and Electronics Engineering,

[1,2]Vidya Vikas Institute of Engineering and Technology, Mysuru, India

Abstract: In the era of advancing technology, efficient management of foot traffic in various establishments has become imperative. The Smart Entry Counter (SEC) represents a pioneering solution aimed at accurately and automatically counting entries and exits within a premise. This abstract explores the fundamental components and functionalities of the SEC, emphasizing its capabilities in real-time data collection and analysis.The SEC operates on a combination of cutting-edge sensors, such as infrared and depth cameras, coupled with sophisticated image processing algorithms. These sensors detect and distinguish individuals entering or existing, ensuring precise counting without human intervention. Data collected bythe SEC is instantly transmitted to a centralized database or cloud platform, facilitating immediate access to entry statistics and trends. Furthermore, the SEC offers versatility in deployment across diverse environments, including retail stores, public venues, and transportation hubs. Its ability to integrate with existing infrastructure and provide seamless operational insights makes it a valuable tool for optimizing resource allocation and enhancing customer experiences.The Smart Entry Counter represents a transformative technology poised to revolutionize the management of foot traffic by offering accurate, real-time data collection and analysis capabilities. As advancements continue, the SEC promises to redefine efficiency and decision-making processes in various sectors, ultimately shaping the future of crowd management systems worldwide.

I. INTRODUCTION

As our world has become more complex, so have the capabilities of the I Micro-controllers embedded into our devices. This project is based on embedded systems and IOT Embedded system is an integrated system that is formed as a combination of computer hardware and software for a specific function. An embedded system combines mechanical, electrical and chemical components along with a computer, hidden inside, to perform a single dedicated purpose. The software of an embedded system is written to execute a particular function.

The methods employed for counting entries and exits have evolved significantly with advancements in technology. Traditional manual counting has largely been replaced by automated systems utilizing sensors, cameras, or even smart phone applications equipped with relocation capabilities. These technologies not only enhance accuracy but also provide real-time data that can be analysed to identify patterns, predict trends, and streamline processes.

Beyond practical applications, counting people entering and exiting a location or event also plays a pivotal role in research and data analysis. It facilitates studies on crowd behaviour, spatial dynamics, and demographic trends, contributing valuable insights to urban planning, marketing strategies, and public policy formulation.

In today's fast-paced world, managing the flow of people through various spaces is crucial for enhancing security, optimizing resource allocation, and improving overall operational efficiency. Our People Counting System leverages advanced technologies to provide accurate and real-time data on the number of people entering and exiting your premises. Our system utilizes a combination of sensors, cameras, and sophisticated algorithms to ensure reliable and accurate counting. Easy to install and integrate with existing infrastructure, it provides a seamless solution to monitor and analyze visitor data.

PROBLEM STATEMENT

Nowadays, all shopping complex has a high security measures to prevent loss of life inside the shopping complex. But these security measures do not include counting the people inside the shopping complex. This is a serious problem when emergency happened, the security unit Op of the shopping complex doesn't know how many people is still inside the shopping complex and how many is already left the shopping complex when an emergency is taking place. By neglecting the visitors counting in the shopping complex, many lives that could have been saved would be lost if emergency occurs. By taking a step further than this, the IR sensors and arduino will sense and count the person entering and out of the shopping complex.

OBJECTIVES OF THE PROJECT

- To develop the smart visitors monitoring system using Arduino Uno and IR sensor.
- To monitor the critical places without the physical presence of any Person Modern systems are gradually shifting from humans monitoring to the centralized control system which involves remotely monitored systems.

II. LITERATURE SURVEY

[1] "Automatic room light intensity detection and control using a microprocessor and light sensors" - Ying-Wen Bai and Fu-Jen

In this paper we propose a design using both a microprocessor and light sensors for automatic room light detection and control. Our design, the HLCM (Home Light Control Module) which will be installed in every light fixture of a family, is made up of four blocks: the pyro electric infrared (PIR) sensor circuit, the light sensor circuit, the microprocessor and the RF module. By using the PIR sensor circuit, the HLCM detects if a human body enters the detection area or not. If there is no human body present, all controlled lights are turned off. If there is, the HLCM detects the light intensity under the environment and maintains sufficient light by controlling the number of lights. We have also integrated an RF module to transmit and receive the data from each HLCM so we can control different lights in different regions. The result of using the HLCM shows that the total power consumption can be reduced.

[2] "Automatic Room Light Controller with Bidirectional Visitor Counter" - Kadam Shah, Prakash Savaliya and Mitesh Patel

This Paper is a reliable circuit that takes over the task of controlling the room lights as well as counting number of persons / visitors in the room very accurately. When somebody enters into the room then the counter is incremented by one and the light in the room will be switched ON and when any one leaves the room then the counter is decremented by one. The light will be only switched OFF until all the persons in the room go out. The totals the signals from the sensors and this signal are operated under the control of program which is stored in ROM. MicrocontrollerSST89E516RD continuously monitor the Infrared Receivers. When any object pass through the IR Receiver's then the IR Rays falling on the receivers are obstructed. This obstruction is sensed by the Micro-controller.

[3] “Entry and exit monitoring using license plate recognition” - Yovan Felix A, Jesudoss A, Albert Mayan J (2017)

In the transport and traffic management system, tracking of vehicles on road is a prime importance vehicles are identified by reading their number plate, the existing system becomes complicated when there is a large number of vehicles being traced at different locations and therefore automatic license plate recognition ALPR is used to extract the contents of the number plate. The image can be fetched by using CCTV cameras with an MATLAB image processing tool. Besides these can be used for a surveillance purpose to facilitate the operations at the toll of many gated communities the identification of vehicles are done through vehicles through motion locating the license plate and accurately identifying the numbers in the license plate. Here we are going to use Adaptive Histogram Equalization AHE, Active contour method for region separation Optical Character Recognition OCR to recognize the characters and Deep Neural Network. DNN is used for classification and extracting the text as an alphanumeric character and comparing the text with the predefined table created in MYSQL server and changing the status accordingly.

III. METHODOLOGY

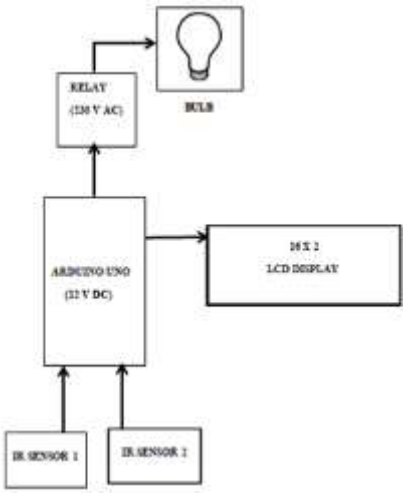

Fig.1: Circuit Diagram of Smart Entry Counter

When a person entering the room which is observed by IR sensor there by the count is updated and is indicated in the LCD display and also the power supply will turn ON , when the person exits from the room the count is updated by another IR sensor on to the display and if there is no person power supply will cut OFF otherwise supply remain in ON state.

The Micro-controller first initializes the stack pointer & other variables, and then scans the IR 1 & IR 2 input pins, which senses the motion of the first sensor if there is no one in front of IR sensor the IR 1& IR 2 ports are at a logic low level. When the motion is detected from the person, the ports IR 1& IR 2 are at a logic high level.

When the logic HIGH is sensed by the microcontroller, first ON the IR 2 and then ON IR 1, as per the program it assumes that the person is leaving the room and the microcontroller decreases the count. When the counter is in ZERO automatically the power will cut OFF.

Components Required

a) Arduino Uno:

Fig. 2: Arduino Uno

The Arduino Uno provides a solid foundation for prototyping and experimentation in the world of electronics and embedded systems. It serves as a reliable platform for counting the entry and exit of people using IR sensors. By leveraging interrupts and appropriate programming logic, it ensures accurate and efficient counting, suitable for various applications such as attendance systems, visitor tracking, and more.

b) IR Sensor:

Fig. 3: IR sensor

IR sensors operate on the principle of detecting infrared radiation emitted by objects. Every object with a temperature above absolute zero emits heat in the form of IR radiation. IR sensors detect this radiation and convert it into an electrical signal, which can then be processed to determine the presence,

movement, or temperature of the object.When integrated with an Arduino or similar microcontroller, they enable real-time monitoring and data collection, supporting applications ranging from retail analytics to building management and beyond.

c) LCD Display:

Fig.4: LCD display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc.. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments

d) Relay

Fig. 5: Relay

A relay is an electrically operated switch that uses an electromagnet to mechanically operate its contacts. It allows a low-power signal to control a higher-power circuit, making it an essential component in many electrical and electronic systems.Relays play a crucial role in counting the entry and exit of people by integrating with sensors, processing signals, and managing the data flow in a controlled and accurate manner. They form a fundamental part of automated systems designed for occupancy monitoring and control.

Hardware Model

Fig. 6: Experimental Setup

Fig. 7: Model Output

Advantages

- No need of human intervention
- Can work 24x7 without any problem.
- Low cost and very easy to implement.

Applications

- The Bidirectional Visitor Counter can be used domestically to get an indication of the number of persons entering a party
- It can be used at official meetings can be used at homes and other places to keep a check on the number of persons entering a secured place.
- It can also be used as a home automation system to ensure energy saving by switching on the loads and fans only when needed.
- It is a low-cost system which can be used for counting purpose

IV. CONCLUSION & FUTURE SCOPE

Counting the entry and exit of people through sophisticated sensor and relay systems represents a transformative approach to understanding and managing human flow within various environments. This technology-driven capability extends far beyond basic tracking; it empowers organizations across sectors to optimize operations, enhance safety, improve customer experiences, and glean valuable insights for strategic decision-making.

A smart entry counter offers a reliable, efficient, and data-driven approach to monitoring and controlling entry points. With its numerous benefits, including improved crowd management, optimized resource allocation, and enhanced user experience, smart entry counters are poised to revolutionize the way we manage entry points in various settings, from commercial buildings and public venues to residential complexes and events.

Future Scope

1. Public Safety - Enhancing public safety measures by monitoring crowd densities and optimizing emergency response strategies based on real-time data.
2. Real-time Decision Making: Enabling businesses to make agile decisions based on up-to-the-minute insights into foot traffic and occupancy levels.
3. Customer Journey Mapping: Creating comprehensive maps of customer journeys within retail spaces to optimize layout, product placement, and promotional strategies.
4. Integration with emerging technologies like facial recognition, biometrics, image processing and AI-powered analytics for enhanced security and personalized experiences.

References

[1] Ying-Wen Bai and Fu-Jen, "Automatic room light intensity detection and control using a microprocessor and light sensors".

[2] Kadam Shah, Prakash Savaliya and Mitesh Patel, "Automatic Room Light Controller with Bidirectional Visitor Counter".

[3] Yovan Felix A , Jesudoss A , Albert Mayan J (2017) ,"Entry and exit monitoring using license plate recognition ".