ARDUINO BASED SMART AUDITORIUM POWER SAVING SYSTEM

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ABSTRACT

This paper major goal is to develop and implement energy-saving techniques in public spaces like theatres, malls, and auditoriums, among others. All of these gadgets or equipment require either human labour or a controlling system to operate and be monitored. This project explains how electrical and electronic devices may operate intelligently with automatic control using an Arduino controller. At the entrance door, there is a metal detector for security purposes, and the auditorium has a fire alarm as well. By adjusting fan speed in accordance with the auditorium's temperature and seating configuration, energy savings are obtained. These processes have all been completed with a very small power supply. Depending on the number of persons present, the corresponding count value is shown on the number of audiences present in the theatre as represented on the LCD panel.

Appliances in the auditorium are automatically controlled in this manner based on the audience's presence. The "ENTRENCE IR Sensor" detects any person entering the auditorium and displays the number of people present. The LCD panel will indicate "AUDITORIUM full" if the auditorium is full. Therefore, by putting this idea into practise, we can limit the amount of power wasted in these types of regions.

Keywords: Sensors, Arduino, LCD, Buzzer, LED,DHT,ESP 32 CAM .

INTRODUCTION

IOT (internet of things) introduction Industry observers predict that the digital world will continue to experience considerable changes in the coming years. The most recent addition to the digital world (IoT) is the Internet of Things. The Internet of Things (IoT) is also known as the interaction of the software, telecommunications, and electronic hardware industries, and it has the potential to create a wide range of new opportunities for a number of different industries.

Internet of Things (IoT), which will be supported by trillions of sensors, billions of intelligent systems, and millions of applications, will change how consumers and businesses behave and require increasingly sophisticated industrial solutions, creating trillions of dollars' worth of opportunity for the IT industry and even more.

Many industries, including agriculture, health care, energy, security, disaster management, and others, face issues that can be automated. IoT application and service adoption has been spearheaded by telecommute operators and system integrates since the technology offers them potential to significantly boost their revenue. Beyond direct IoT applications, the IT sector has the ability to provide IoT-related services, analytic, and apps There are three major phases in the Internet of Things: 1. data-gathering sensors (including sensor/device identification and addressing); 2. a data-gathering and data-analysis application; 3. 3. Decision-making and information transfer to the decision-making server Internet of things block diagram The IoT Board, where we can write programmes and dump data, is the application's brain. Depending on the application, the IoT Board could be either an Arduino or a Raspberry Pi. The Arduino Suite can be used as a platform to dump the programme (Phyton/C++) via the I2C Communication Protocol or Serial Communication Protocol. This system is based on the Arduino platform. The sensor module will measure the physical parameters and output a voltage signal that is delivered to an analogue input (A 0 to A 5) of an Arduino or Raspberry Pi board. A RF module will be utilised for radio signal transmission and reception. When using an IoT application, he emergence of embedded systems An embedded object is one that is joined to another object. A computer hardware system with software embedded in it is an example of an An embedded system refers to an object that is integrated or connected to another object. It commonly consists of computer hardware with embedded software. This system can exist as a standalone unit or serve as

a smaller component within a larger system. Embedded systems are typically designed with a specific purpose in mind and rely on microcontrollers or microprocessors for their functioning. For example, a fire alarm is an embedded device that specifically detects smoke. Another example would be an electronic device that incorporates software integrated into a computer, thereby qualifying as an embedded system.

Depending on the application, it can be programmed or not. A method of working, organising, and carrying out one or more tasks in accordance with a set of rules is referred to as an embedded system. In an embedded system, every component comes together and functions as a whole in accordance with the programme. Numerous goods, such as microwaves, washing machines, printers, cars, cameras, etc., are examples of embedded systems.

Microprocessors, micro controllers, and processors like DSPs are all used in these systems. The key attributes of an embedded system are its speed, size, power, precision, and flexibility. As a result, real-time applications can be used with an embedded system when it executes activities quickly.

The system's size and power consumption should be very minimal before it can be an embedded system is a programmable computer that is designed for specific applications and is used in a wide range of industries, including medical devices, home appliances, academic tools, military equipment, and more. While the applications of embedded systems have expanded greatly, there are core functionalities that remain consistent across many devices. One such essential application is network interfacing, which enables communication, control, and sensing capabilities in embedded devices. This application is crucial for managing systems that handle large volumes of data, such as servers, data center networking equipment, and devices involved in processing internet-based data. Additionally, embedded systems are equipped with programmable chips that allow for customization and programming to suit specific requirements.

LITERATURE SURVEY

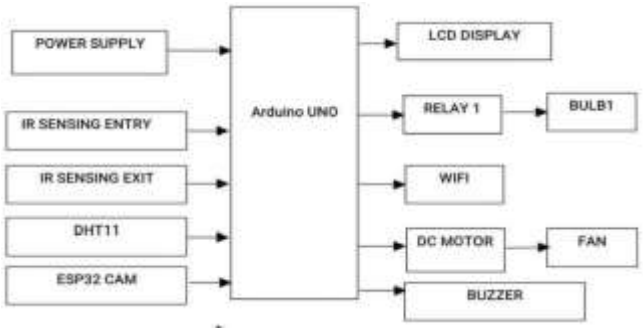
That Numerous initiatives are being made to intelligently control the electrical equipment in public spaces including theaters, shopping malls, and other venues. This has been implemented using a variety of technologies with power conservation as the primary goal. The projects that are similar to our project that utilized micro controllers as their foundation are listed below. This paper's major goal is to design and implement energy-saving measures in public spaces like theaters, malls, and auditoriums, among others. We need a human or controlling system to operate and keep track of all of these appliances or pieces of equipment. The whole operation of electrical and electronic equipment with automatic control and power conservation in theaters, malls, and auditoriums is described in this study. They used a micro controller from the MCS 51 family to put this into practise.

PROPOSED SYSTEM

lot of time and effort. Working in this way can result in significant catastrophes and devastation. The biggest problem with manual light switches is that they waste a lot of time talking when they should be turned on in the evening and a lot of energy when they can't all be shut off in the morning

As a result, temperature sensors can be used to create a noThe technology begins to operate by counting the number of persons present in the auditorium and detecting their entry. The parameter used to regulate devices like fans is this count. The entry door's metal detector checks for the presence of metal and activates the buzzer if it does. Entry and exit sensors are placed at the entrance and exit doors to identify individuals entering and departing the auditorium. This information is sent to the micro controller, which then displays the number of individuals inside on the LCD panel. The path light in the auditorium will direct a person into a vacant seat beginning when they enter.

This paper's major goal is to design and implement energy-saving measures in public spaces like theaters, malls, and auditoriums, among others. An auditorium often contains a large number of electrical and electronic appliances and equipment. We need a human or controlling system to operate and keep track of all of these appliances or pieces of equipment. In this study, we demonstrate how an electrical circuit may easily control and conserve energy in public spaces such as theaters, malls, and auditoriums without the need for a human operator. The whole operation of electrical and electronic equipment with automatic control and power conservation in theaters, malls, and auditoriums is described in this study. Utilizing a micro controller from the MCS 51 family, IR sensors, and LDR (light detection and ranging)



The temperature sensor, which is automatic in nature and installed inside the auditorium, controls the fan speed. Security is provided via a metal detector at the auditorium's entrance.

Additionally, a relay and a stationary CC camera are present.
The system needs to be optimized to be both affordable and energy-efficient. Manually controlling the lights requires a vel method of autonomous fan speed regulation. Regulators can be used to regulate the speed of frequently used fans, although this is a cumbersome and old-fashioned method. Additionally, this method loses effectiveness when the temperature needs to be monitored over extended periods of time. Make a device or piece of hardware that can control the fan's speed in response to temperature. A reliable circuit that assumes control of accurately counting the number of individuals in the room is the digital visitor counter. The counter goes up by one whenever someone enters the room and goes down by one if someone leaves. Liquid crystal screens show every person in the room.

RESULTS

At first, all of the fans were turned off and the LCD screen said "empty auditorium" when the room was empty.
The guiding LEDs were turned on, and the LCD is showing the count and the path to the specific row.The first block's fan's control signal was activated and turned ON at the same moment.
The fan for that block is turned on as soon as the individual enters the second one.
the entry door's IR sensor engaged, signalling a person's entry. Exit IR sensors similarly identify those who leave the theatre.
The metal detector, which operates on Colpitts oscillator theory, is situated at the entrance to the auditorium

FIG 1: ARDUINO BASED SMART AUDITORIUM POWER SAVING SYSTEM KIT

FIG 2: DETECTS THE NUMBER OF PERSONS

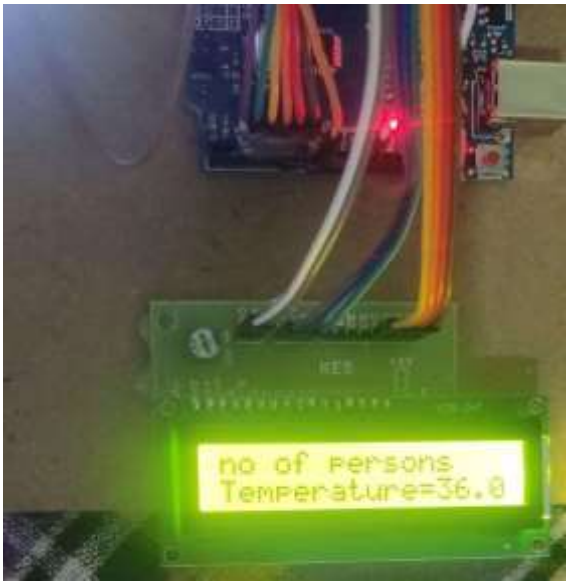


FIG 3: MEASURES THE TEMPERATURE OF AUDITORIIM

CONCLUSION

The micro controller pins P0.0 and P0.1 are directly connected to the two IR sensors/LDRs. A high pulse and a low pulse are applied from the two sensors' output. These high and low pulses are referred to as "set-1" and "reset-0," respectively. And the micro controller uses the written or spilled code in it to verify these conditions. Assembly language is used to write the code or programme. The "entrance" IR sensor scans and counts the number of people entering the theatre, mall, or auditorium. Then, in accordance with the count specified in the programme or code, automatic switches are turned on for lights, fans, and other electrical and electronic appliances. In this project, two "dc" fans and one "ac" bulb were used to show the idea.

FUTURE SCOPE

The Internet of Things (IoT) has rapidly emerged as a dominant technology worldwide, gaining immense popularity in a relatively short span of time. This growth has been facilitated by significant advancements in artificial intelligence (AI) and machine learning (ML), which have simplified the automation of IoT devices. By integrating AI and ML programs, IoT devices can be effectively automated, expanding their potential applications across various industries. In this section, we will explore the healthcare, automotive, and agricultural sectors to discuss the diverse uses and potential of IoT. Notably, IoT technology offers remarkable user-friendliness and can operate autonomously, eliminating the need for constant human involvement. Additionally, IoT holds the promise of energy efficiency, as even a small number of electric bulbs can consume a significant amount of energy.

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