

Intelligent Conference Hall Automation System

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Abstract: Electricity is the most valuable resource which is vital for Human life. Generally, Electricity is wasted due to our carelessness by switching on all the unnecessary electric devices like fan/light etc.,.Many of us forget to turn off the electrical devices like fan/ac/light when they leave the room .So Automation system is required to Control the devices automatically inside the hall. INTELLIGENCE CONFERENCE HALL AUTOMATION SYSTEM is the technology needed for saving electricity . It is a IOT based system which uses micro controller/ Arduino UNO to control all the electric devices inside the conference hall without any human effort and also this system is useful to counts(Bidirectional) number of persons inside the hall by using Ir sensors and indicates whether the hall is full or empty by using LCD and sanitize the persons outside the room by using ultra sonic sensor and the fan/light is on/off depends upon the person sits inside the hall and there is a buzzer indication for smoke by using MQ2 sensor and piezo electricity is used as alternate current source to save electricity. so, the system is completely automated by using IOT.

KEYWORDS: Automation system, Arduino UNO, IR sensor, LCD, MQ2 sensor, Piezo sensor.



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DOI of the Article: <https://doi.org/10.46501/GIETEC13>



Available online at: <https://ijmtst.com/icetee2021.html>



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To Cite this Article:

T Ravindra; B Suma Tejasri; P Rama Kishore; T Sai Kumar and P Lava Raju. Intelligent Conference Hall Automation System. *International Journal for Modern Trends in Science and Technology* 2021, 7, pp. 70-75. <https://doi.org/10.46501/GIETEC13>

Article Info.

Received: 18 May 2021; Accepted: 25 June 2021; Published: 30 June 2021

INTRODUCTION

Electricity is one of the most important factor that is used everyday in our daily life's . Population is increasing day by day so the consumption of the electricity also increasing . Hence it is required to conserve electricity and use it wisely to save for our next generation .Automation is the system which is used save the electricity and reduces the human effort to control and operate any electrical device. The main advantage is to save energy, labour work to improve quality, accuracy there are so many Conference hall Automation systems which is developed based in Bluetooth, WiFi, GSM .the disadvantage using this is increases the cost of the system .

To overcome all the disadvantages in above system we have designed a Smart and Intelligent Conference Hall Automation system. This system is designed using multiple sensors, Arduino controller board and Output devices. Embedded C Programming language is used to code this Micro controller board and Arduino IDE Compiler is used to upload the program. Two IR Sensors are used as Bi-Directional counter at Entry and Exit Gate and value is displayed on LCD Module and if the hall is full then the Message will be displayed in LCD Module and the proposed system has mq2 sensor to indicate the smoke and we used the sanitizer block as it uses the IR sensor to sense the hand outside the hall and sanitizes it and piezo tile is used to reduce the consumption of the electricity and automatic door is also there to open and close automatically by using DC motor and IR sensor ,so this complete system makes the Conference hall Smart and effective which reduces the human efforts and also control the electric consumption

OBJECTIVES:

The main objective of this proposed system is to reduce the consumption of the electricity in the big conference halls and also reduce the human efforts to control the electric devices inside the hall and also make the hall smart by adding sanitizer block , automatic door , piezo sensor , smoke indicator , automatic fan/light , on/off depends on person sitting inside the hall.

STRUCTURE OF THE PAPER:

The paper is prepared as follows : In Section I , Introduction and objective along with structure of the paper and all required elucidations are present . In

Section 2,we continue the literature review of previous existing systems. In Section 3,explains the the design of the proposed system using IOT. In Section 4, we discussed the Block diagram along with hardware devises.In Section 5, we declared the Result and analysis ,In Section 6 we come across the Conclusion , Future scope and References.

LITARATURE REVIEW

Conference hall automation system is designed to reduce the consumption of the electricity and also to reduce the human efforts to control the electrical devices inside the hall. Alex Joy et. al.,have introduced a micro-controller based Room automation system which uses ATMEGA328 micro-controller.It has automatic room light and temperature controller which the light/fan are controlled depends upon the intensity of light and temperature inside the Room. The drawback is that the cost of establishment is very high and the AC operation is not automated.

Some of the proposed systems are only deals with the control of electric devices like light/fan and the cost of the systems are very high .

DESIGN AND WORKING OF INTELLIGENT CONFERENCE HALL AUTOMATION SYSTEM USING IOT

Intelligent Conference Hall automation system is completely IOT based project which is used to control the devices inside the hall and conserve the electricity by using piezo sensors inside and outside the hall.This proposed system is designed using multiple sensors, Arduino controller board and Output devices. Embedded C Programming language is used to code this Micro controller board and Arduino IDE Compiler is used to upload the program. Two IR Sensors are used as Bi-Directional counter at Entry and Exit Gate. Counter Value of total person is displayed in LCD Module. If the counter value crosses the predefined threshold value than "House Full" Message will be displayed in LCD Module. Smoke sensor(MQ2) is used to detect the any Fire or Cigarette Smoking inside the Conference Room. If Smoke is detected, than buzzer sound is produced. IR based Person detection Sensor is used, if any person is detected in particular block than that particular Light and Fan is switch On or Switched

off Automatically. Automatic Hand Sanitizer Dispenser is interfaced with this system using IR Sensor. If any person hand is detected using IR Sensor than DC pump is switched on and Off for 3 – 5 Seconds and sanitizer is dispensed. IR based Automatic Door Open and Close system is designed using IR Sensor. If any person is detected in front of this sensor, than Door will be Automatically Open and closed using L293D Motor Driver and DC Geared Motor.

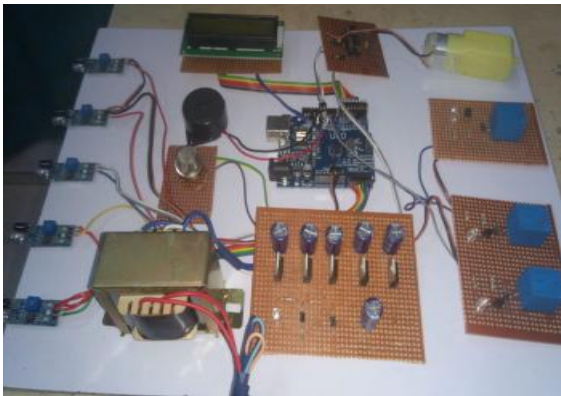


Figure 1: Conference Hall Automation System Setup

This system is also powered using Foot Step power generation technique. Using this method, Piezo electric materials used to generate Voltage on every foot step which is arranged at the door. This voltage is rectified and further used to charge battery. This battery voltage is used to power the voltage regulators and filter capacitors. The power supply or battery charging setup of the system contains a step down transformer of 230/12V, used to step down the voltage to 12VAC. To convert it to DC, a bridge rectifier is used. Capacitive filter is used which makes use of 7805 voltage regulator to regulate it to +5V that will be needed for micro controller and other components operation, in order to remove ripple. Hence by connecting all this sensors to the respected analog and digital pins in Arduino UNO. Then the system starts working effectively.

BLOCK DIAGRAM

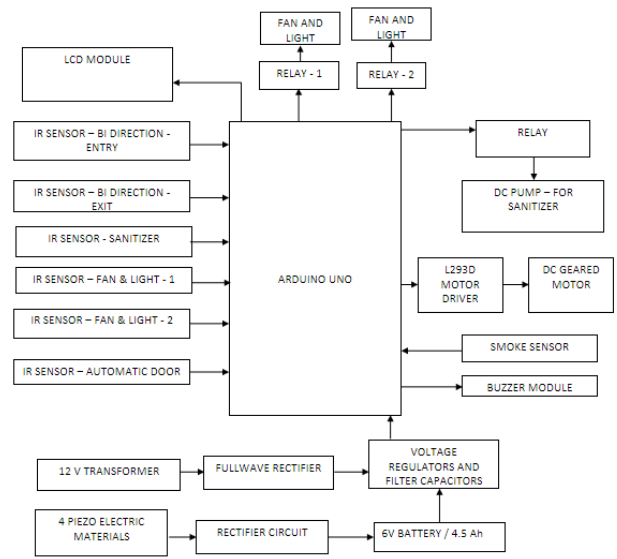


Figure 3: Block Diagram of proposed system

HARDWARE USED:

- Arduino UNO
- IR sensor
- LCD module
- Smoke sensor(MQ2)

ARDUINO UNO:

The Arduino UNO is a micro controller board based on the ATmega328 . Arduino has 14 digital input/output pins [of which 6 can be used as PWM outputs] 6 Analog inputs, a 16 MHz ceramic resonator, a USB connection at one side, power source,voltage regulator, an ICSP header, and a reset button.

Arduino uses both hardware and software platforms.

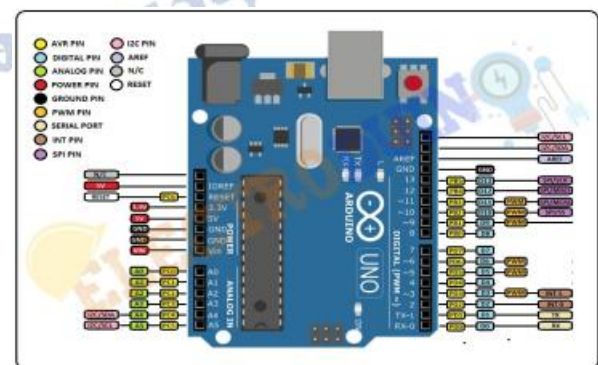


Figure 4: Arduino UNO Pin specification.

The Arduino program can be written in any language by using platform called Arduino IDE, and that program can be easily uploaded into Arduino by using USB cable.

IR SENSOR:

. IR sensor consists of two important parts one is IR source/transmitter and second one is IR detector/receiver. When the object comes the transmitter transmits and receiver receives the data and gives the required output.

It is used as a Bidirectional counter to count the persons entering and exiting and to count the number of persons inside the hall and to control the light/fan inside the hall depends on the number of persons inside it.



Figure 5: IR Sensor

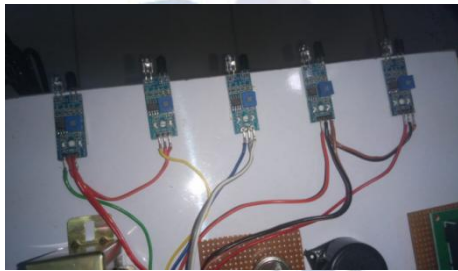


Figure 6: Arrangement of IR sensors for the proposed system

USAGE OF IR SENSORS IN THIS PROPOSED SYSTEM

IR-1 for Bidirectional Counter

IR-2 for sanitizer block

IR-3,4 for automatic light/fan

IR -5 for automatic Door open

This proposed system uses 5 Infra-Red sensors to control all the devices inside the hall and to work smartly outside the hall and all the sensors are

controlled by using IOT by connecting smartly to the single Arduino board.

Thus it sensors the input and sends to the Arduino and gives the output accurately

LCD MODULE:

LCD stand for Liquid Crystal Display. It is used to display the count of people and shows whether the hall is full or empty.



Figure 7: LCD display



Figure 8: LCD display of this proposed system

A Liquid Crystal Display (LCD) is a flat panel display which uses liquid crystals which emit light by using light modulation. The most commonly used display is 16X2 LCD. It displays up to 16 characters per line and there are 2 lines.

In this proposed system LCD is used to display the persons count automatically and also it gives the intimation of "House Full", when there is no space inside the hall so we need not to check it.

SMOKE DETECTOR:

MQ2 gas sensor is an electronic sensor used for sensing the concentration of gases in the air such as Methane, Propane, LPG, hydrogen, carbon monoxide, alcohol, smoke (cigar).



Figure 9: MQ2 gas sensor

This sensor is also known as chemo-resistor which helps to detect the gas/smoke. It works on 5V DC voltage. Used to detect the smoke or gas inside the hall and indicate by using buzzer.

RESULT AND ANALYSIS

- By connecting all the equipment correctly we got the following results:
- The proposed system uses the piezo electric voltage(millivolt)when the person steps on the piezo tile.
- There is a sanitizer block at the door which works when we place our hand near it and sprays sanitizer.
- The door is opened automatically when the person stands by using IR sensor.
- Bidirectional IR sensor Counts the persons entering and leaving the hall at entry and exit and displays it on the LCD.
- There is a indication on the LCD “house full” when the hall is full.
- When a persons sits in one place inside the hall then the respected light/light on,and automatically offs when no one inside it.
- When there is a smoke inside the hall and that is indicated by the buzzer.

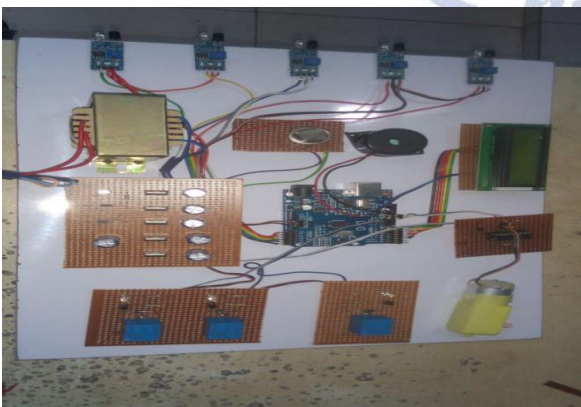


Figure 10: Complete arrangement of Conference hall automation system

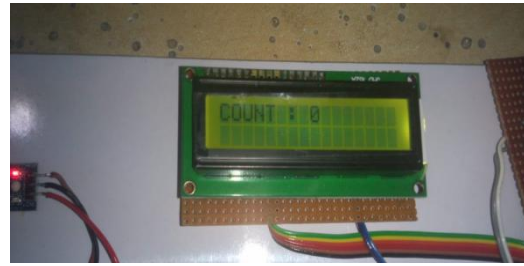


Figure 10:LCD display when no one enter the room



Figure 11: LCD display when there are 3 persons inside the room

CONCLUSION AND FUTURE SCOPE

The design of conferencehall automation system helps to conserve electricity and also makes the electrical devices inside the room works effectively and also gives the information about number of persons inside the hall and sanitizes us without any human need and it automatically open the door which is also helpful in this pandemic situation(Covid).The proposed system reduces the manual effort to operate all electrical devices, Thus Time, energy, electricity, human efforts are saved. This system has been designed with practical and adaptable approach that will allow more efficient and effective operation of the conference room.

We are planning to control the temperature of the AC depend on the temperature and humidity inside the room and also depends upon the number of persons inside the hall.and we are also planning to implement sensors that controls the brightness of the room.

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