



IoT Based Development of Smart Board Room

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Abstract :The Smart Board Room is an innovative technological breakthrough designed to improve the administration and functionality of conference and seminar rooms.

The area is equipped with energy-efficient technologies, like HVAC and smart lighting, which help to reduce energy use and operating costs. Sustainability features like motion-activated lighting and eco-friendly materials are in line with business responsibility and environmental aims. Similar to touchscreens or smartphone apps, the Smart Board Room's user interface is simple to use. Many areas of the space can be easily manipulated by users, including speakers, attendees, and event organizers. The Smart Board Room is flexible and can be tailored to the needs of different businesses, corporations, and event venues, among other kinds of organizations. It is a vital tool for companies trying to improve the intelligence, effectiveness, and sustainability of their seminar and conference spaces because of its scalability, efficiency, and focus on the user experience.

Keywords - IoT, Office Automation, E- Scheduling, RFID, Data Logging

INTRODUCTION

In today's fast-paced world, there is an increasing demand for functional, user-friendly, and adaptable facilities. The Smart Board Room, by reimagining these areas, saves time and resources while enabling smooth automation, improved user experiences, and sustainability. The hall can be easily configured to meet specific requirements. Automated lighting and seating layouts can be altered with the push of a button to swiftly switch between event types and accommodate varying group sizes.

In conventional systems we had trouble taking manual attendance during training sessions at the college auditorium. Even if they hadn't gone, some students would dishonestly mark themselves as present. To make matters worse, there was a lighting issue. Every time the projector was in operation, the lights had to be manually turned off. On the other hand, manually turning on the lights again was necessary after turning off the projector.

In order to tackle these difficulties, we put forth the idea of a Smart Board Room. With this configuration, each participant will receive an RFID card, and attendance will be tracked by RFID technology. The attendance system will immediately record their presence as soon as they enter the seminar hall and save it to the cloud. The system will also welcome attendees and show seat assignments. The system will automatically turn off the lights and close the curtains when the projector is in operation and return the settings when it is switched off.

NEED OF THE STUDY.

Energy conservation is of utmost importance for the future, with the primary obstacle we currently confront being the global energy crisis. The objective of this initiative is to tackle this challenge through the automation of processes aimed at conserving energy and minimizing the need for human intervention, aligning with the demands of contemporary technological advancements. To initiate the problem-solving process, initial efforts have been concentrated in the board room, with plans in place to progress to larger spaces such as auditoriums and seminar halls following successful testing of the system.

LITERATURE REVIEW

In paper [1] it is mentioned as Seminar hall automation utilizing microcontroller technology for the purpose of electricity conservation is discussed in this project. The project encompasses a person counter, as well as controllers for room light and temperature.

In Paper [2] it is mentioned as This system is designed to tackle the necessity for contactless management of attendance, particularly in educational establishments amidst the COVID-19 crisis. Through the incorporation of RFID technology for attendance tracking and IoT for transmitting data to the cloud, the system guarantees effective and protected supervision.

In paper [3] it is mentioned as the manuscript introduces an Internet of Things (IoT) driven Radio Frequency Identification (RFID) attendance system as an alternative to traditional manual documentation. The primary objective of this system is to enhance the precision and effectiveness of attendance monitoring.

In paper [4] it is mentioned this system intends to automatize the management of attendance, improve precision, and diminish manual labor. Through the amalgamation of RFID modules with Arduino Uno boards, attendance information can be effectively acquired and analyzed instantaneously utilizing Python Django on the AWS cloud.

In paper[5] it is mentioned a designed curtain control system has been developed to enhance the functionality of regular curtains. This system allows for easy installation and enables remote control via a mobile phone application. Additionally, it is capable of automatically adjusting the opening and closing of the curtains based on the light intensity to optimize indoor lighting, as discussed in this study.

In paper[6] it is mentioned as An energy-efficient intelligent lighting system decreases power wastage by 44%. The system autonomously adapts the intensity of light according to various zones within a room.

In paper[7] it is mentioned as In the present study, a sophisticated curtain system utilizing IoT (Internet of Things), voice recognition technology, AI (Artificial Intelligence), and solar power was conceptualized. However, the specifics of the smart curtain's design were not addressed.

In paper[8] it is mentioned as A suggested cost-effective modular framework for the management of lighting, coupled with integration with an intelligent system aimed at acquiring knowledge on sleep patterns.

In paper[9] it is mentioned as Research on the utilization of wireless sensors in an automated curtain adjustment system is paramount. Emphasis should be placed on advancements in smart home technology and the implementation of remote control for curtains.

In paper[10] it is mentioned as The wireless intelligent curtain control system incorporates a single-chip microcomputer to automate curtain control, providing operational flexibility, ease of use, cost-effectiveness, and high levels of safety and reliability.

In paper[11] it is mentioned as An automatic control system utilizing STM32 for operating curtains is suggested. The system comprises diverse modules for monitoring temperature, detecting light levels, and managing motor functions.

METHODOLOGY

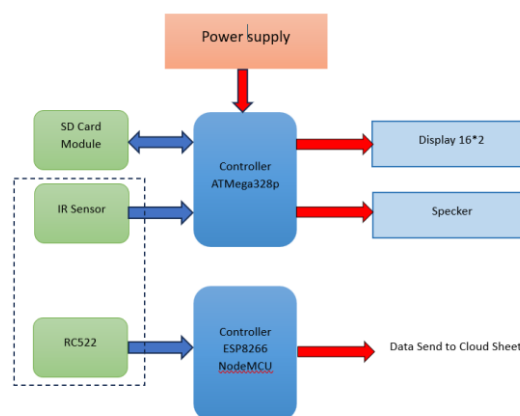


Figure 1

Both a smart curtain system and smart attendance are part of the Smart Boardroom system. The smart attendance system, where attendance is recorded upon entering the hall, is depicted in the block diagram. Firstly, the RFID receiver scans an RFID card. Using a NodeMCU to record the time and date, this activity reports attendance on an Excel sheet. The guest is also greeted by the system, which also shows their seat assignment on a screen. Greetings and the list of seat assignments, which includes the total number of attendees for the meeting, are stored in the SD Card module.

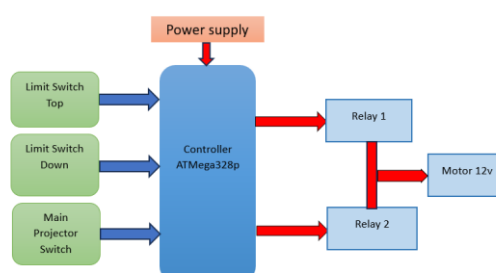


Figure 2

The purpose of the Smart Curtain system is to automatically operate curtains in connection with a projector. The lights will decrease and the curtains will automatically close when the projector is turned on. On the other hand, the curtains will open and the lighting will return to normal when the projector is switched off. Limit switches and relays are used in the system that raises and lowers the curtains. The goal of this automation system is to give users a seamless experience by doing away with manual intervention and interruptions during sessions.

RESULTS AND DISCUSSION

By automating attendance monitoring and giving guests a personalized greeting and seat assignment display, the Smart Boardroom system improves productivity. The system records attendance and handles data management with ease thanks to RFID technology and NodeMCU.

The Smart Curtain system dynamically modifies lighting and drapes in response to projector action, enhancing the boardroom arrangement. When the projector is turned on, the curtains close and the lights get dim; when it is turned off, the curtains open normally. Relays and limit switches power this automation, which lessens the need for manual labor and improves the audience's overall experience during meetings and presentations. When used in tandem, these technologies enhance the boardroom atmosphere and simplify processes to increase convenience and efficiency.

Table 1

	A	B	C	D
1	Date	Time	Student ID	Frist Name
2	4/16/2024	11:39:59	9	Aadesh
3	4/16/2024	11:27:58	3	Ram
4	4/16/2024	11:21:35	9	Aadesh
5	4/16/2024	11:18:54	9	Aadesh
6	4/16/2024	11:17:05	3	Ram
7	4/16/2024	11:14:22	3	Ram
8	4/16/2024	11:12:16	10	Aaditi

Table 2

D	E	F	G
Frist Name	Last Name	Phone Number	Address
Aadesh	Kadam	8877676565	Malegaon
Ram	Sharma	9292919100	Nashik
Aadesh	Kadam	8877676565	Malegaon
Aadesh	Kadam	8877676565	Malegaon
Ram	Sharma	9292919100	Nashik
Ram	Sharma	9292919100	Nashik
Aaditi	Mahale	878686756	Ozer
Mahesh	Wagh	887677656	Satana

Table 3

	A	B	C	D	E	F	G
1	Date	Time	Student ID	Frist Name	Last Name	Phone Number	Address
2	4/16/2024	11:39:59	9	Aadesh	Kadam	8877676565	Malegaon
3	4/16/2024	11:27:58	3	Ram	Sharma	9292919100	Nashik
4	4/16/2024	11:21:35	9	Aadesh	Kadam	8877676565	Malegaon
5	4/16/2024	11:18:54	9	Aadesh	Kadam	8877676565	Malegaon
6	4/16/2024	11:17:05	3	Ram	Sharma	9292919100	Nashik
7	4/16/2024	11:14:22	3	Ram	Sharma	9292919100	Nashik
8	4/16/2024	11:12:16	10	Aaditi	Mahale	878686756	Ozer

Table 4

3/7/2024	21:12:51	9	Aadesh
3/7/2024	21:12:40	9	Aadesh
3/7/2024	21:10:15	9	Aadesh
3/7/2024	21:09:52	10	Aaditi
3/7/2024	21:09:35	3	Ram
3/7/2024	12:43:38	10	Aaditi
3/6/2024	23:22:25	3	Ram

Table 5

Aadesh	Kadam	8877676565	Malegaon
Aadesh	Kadam	8877676565	Malegaon
Aadesh	Kadam	8877676565	Malegaon
Aaditi	Mahale	878686756	Ozer
Ram	Sharma	9292919100	Nashik
Aaditi	Mahale	878686756	Ozer
Ram	Sharma	9292919100	Nashik

CONCLUSION/ DISCUSSION

There are various advantages to combining a smart curtain system with smart attendance in a boardroom environment. First off, the NodeMCU and RFID-powered smart attendance system automates attendance monitoring by logging inputs into an Excel sheet and adding a date. This guarantees correct attendance records while also saving time. In addition, the system's capacity to welcome guests and show seat assignments on a screen improves visitor satisfaction and streamlines seating arrangements.

Second, the environment of the room is automated by the smart curtain system, which is synchronized with the projector. The optimal viewing circumstances for presentations are achieved by the curtains closing and the lights dimming when the projector is turned on. On the other hand, efficiency is increased and distractions are decreased when the projector is deactivated and the curtains open and the lighting returns to normal.

The curtain automation's usage of limit switches and relays highlights how dependable and user-friendly the system is.

In summary, the incorporation of these intelligent systems into a boardroom results in increased productivity, an improved user experience, and a decrease in manual intervention and interruptions during presentations or meetings. This extensive automation helps create a smoother and more efficient meeting environment in addition to modernizing the boardroom.

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