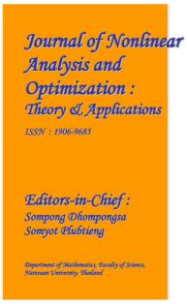
Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 15, Issue. 1, No.11: 2024
ISSN : **1906-9685**



SMART CLASSROOM BY USING ALEXA AND GOOGLE ASSISTANT

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ABSTRACT
The "Smart Classroom by using Alexa and Google Assistant". This article taps into the trend of utilizing technology to automate manual tasks within the class environment. The system operates via a web-based interface, enabling direct interaction between users and the classroom. Meanwhile, classroom appliances were remotely controlled through various means like: remote controls, voice commands via Alexa and Google Assistant with having various features, manual overrides. The integration of relay hardware circuits with the server facilitates seamless management of appliances, ensuring efficient operation. Smart classroom offers numerous benefits, including enhanced energy efficiency and cost savings, addressing the critical issue of energy consumption in smart classroom. With the rising popularity of wireless technologies like Wi-Fi and Bluetooth in class networking. These advantages enhanced user convenience, precise control over devices, creation of comfortable living environments, and remote accessibility for control purposes. Overall, this articel explains the evolving landscape of smart classroom, leveraging technology to create smarter, more efficient living spaces that cater to the needs and preferences of modern classroom.

INTRODUCTION
The "SMART CLASSROOM BY USING ALEXA AND GOOGLE ASSISTANT" refers to the automated control of electronic devices within a class environment. These devices are interconnected via the Internet, enabling remote control and automation. With class room, devices can interact with each other autonomously, reducing the need for manual intervention through apps or voice assistants. A part from enhancing convenience, class room can lead to cost savings on

http://doi.org/10.36893/JNAO.2024.V15I1N01.369-377

utility bills by optimizing electricity usage. Moreover, it can bolster safety through the integration of Internet of Things (IoT) devices controlled remotely. The integration of cutting-edge technologies like Alexa, Google Assistant, a cadio app, an IR remote, a 4-channel relay, HL link, and ESP32 microcontroller presents a transformative vision for the modern classroom. By harnessing the power of voice assistants such as Alexa and Google Assistant, educators can facilitate seamless interaction with classroom devices, streamline administrative tasks, and enhance the learning experience through voice commands. The IR remote and 4-channel relay offer traditional yet essential control mechanisms, enabling manual operation and remote control of various classroom appliances and devices. Moreover, the HL link and ESP32 microcontroller serve as the backbone of the smart classroom infrastructure, enabling wireless communication between devices and facilitating data exchange and automation. Together, these technologies form a comprehensive ecosystem that revolutionizes the classroom environment, fostering innovation, efficiency, and engagement while empowering both educators and students to thrive in the digital age.

LITERATURE SURVEY

[1]On the Application of Smart Home Technology to prolong classroom equipment lifetime by Tutun Juhana, Erdy Suryadarma, Gregorius, K. Purwidi, Fadhli Dzil Ikeam, Christian Hendy in 2014. The articel lies in the development of a smart home-based monitoring system that effectively prolongs classroom equipment lifetime through remote control, energy-saving measures.It has a drawbacks The reliance on a separate monitoring system and the lack of integration with widely used voice assistants. [2] Creating Smart Classrooms to Benefit from Innovative Technologies and Learning Space Design by Dr. Faouzi Bouslama and Dr. Faisal Kalota in 2013. The articel lies in proposing a framework for smart classrooms, outlining the functionality and features of smart learning spaces, and emphasizing the importance of proper integration and utilization of technologies in education.It have a drawbacksIt include potential complexity, cost implications, and challenges in integration and maintenance. [3] Smart Learning Environment: A Case on the Construction of Smart Classrooms in Colleges and Universities in Guangzhou by Xinxin Deng, Rong Zhang in 2019. The articel lies in analyzing the challenges and potential of smart classroom implementation in educational technology.It have a drawbacks its reliance on complex infrastructure and lack of user-friendly interaction.

http://doi.org/10.36893/JNAO.2024.V15I1N01.369-377

EXISTING METHOD

Smart classrooms integrate technology to enhance the learning environment and make teaching more efficient and effective. Here's an overview of components typically found in existing classroom systems:

1. **Interactive Whiteboards**: Interactive whiteboards (IWBs) merge traditional whiteboard functionality with digital technology, offering a large touchscreen surface for interactive teaching and learning. They enable educators to engage students through multimedia content, collaborative activities, and diverse learning tools. With software applications tailored for education, IWBs support dynamic lessons, cater to different learning styles, and seamlessly integrate with other educational technologies, enhancing the overall classroom experience.
2. **Digital projectors:** Digital projectors are devices that display digital images or video onto a large screen or surface. They utilize light sources and lenses to articel digital content from computers, DVD players, or other multimedia devices onto a blank surface, typically a white screen or wall. Digital projectors have replaced traditional slide projectors and overhead projectors in many settings due to their versatility and ability to display highquality images and videos.
3. **Digital libraries:** Digital libraries offer easy access to a wide range of educational materials like e-books, articles, and videos, empowering educators to create dynamic lessons. By integrating these resources into teaching, students can engage actively with multimedia content, collaborate on projects, and explore topics at their own pace. This fosters interactive learning experiences, encourages participation, and caters to diverse learning styles, ultimately enriching the classroom environment**.**

PROPOSED METHOD

A SMART CLASSROOM BY USING ALEXA AND GOOGLE ASSISTANT utilizes education technology to enhance the learning experience and engage students like never before. By utilizing Alexa, Google Assistant, IOT Devices, and CADIO app for efficient control of appliances via a network of devices that are connected to the Internet through different communication protocols,

i.e. Wi-Fi, Bluetooth, ZigBee, and others. Through electronic interfaces, the devices can be managed remotely through controllers, either a voice assistant. The articel seeks to streamline classroom operations by integrating technology to automate manual tasks. Users can interact with the classroom system through a web-based interface, controlling appliances remotely via voice commands, manual overrides, and scheduling features. By integrating:

- **Software**: Arduino IDE**.**

- **Hardware**:

1.Regulated power supply and Rectifier (HI-Link) it is used to convert Unregulated AC supply to constant DC supply, in order to operate the electronic device.

2.4-Channel Relay Module driver IC is an electromagnetic switch that is utilized whenever a low voltage circuit is used to turn on and off.

3.ESP32 Wi-Fi Module By this we can connect complete system with Wi-Fi connectivity, Bluetooth connectivity, high resolution ADCs, DAC, Serial Connectivity etc.

4.IR Remote An infrared (IR) remote control uses light signals sent from a transmitter located at one end of the remote to a receiver in another electronic device.

5.Alexa is a virtual assistant technology It is capable of voice interaction and it can control several smart devices using itself as like a home automation system.

6.Google Assistant (Mobile application). The smart classroom is to revolutionize classroom management by doing tasks and integrating relay hardware circuits with server technology, the articel aims to facilitate seamless appliance management, ensuring efficient operation and energy savings. Leveraging wireless technologies like Wi-Fi and Bluetooth, it seeks to enhance user convenience, energy conservation, and remote accessibility, ultimately creating smarter, more efficient learning environments tailored to modern needs.

WORKING

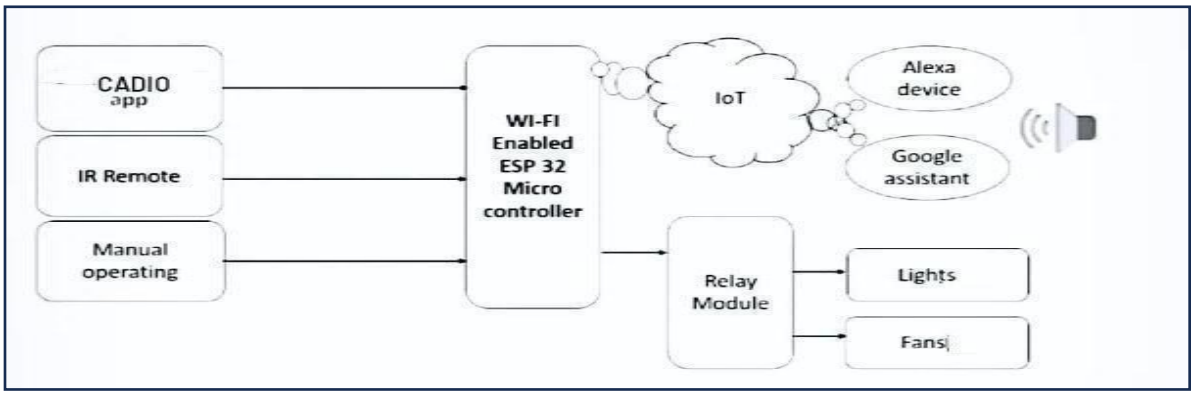

Fig 1:Block Diagram

The block diagram explain the working of the smart classroom by using alexa and google assistant.Inthis system we are using ESP32 Wi-Fi module, which acts as a brain of the system. This module controls the circuit function and Various components are interfaced with this module to perform desired operation of the system. The hardware components used in this system are 4-channel Relays, High Level Link and power supply. In this system, ESP32 Wi-Fi module Acts as the central processing unit for the Smart Classroom system. This Receives commands via Wi-Fi from the Cadio application, Alexa and Google Assistant. Cadio Application Enables control of the

classroom appliances via Wi-Fi. It Provides a user-friendly interface for controlling appliances remotely. Voice Assistants (Alexa, Google Assistant) Allows voice control of the Smart Classroom system. Users can issue voice commands to control appliances using Alexa or Google Assistant. IR Remote and Manual Switches. Additional control options for operating the classroom appliances. Users can use an IR remote or manual switch for convenience.

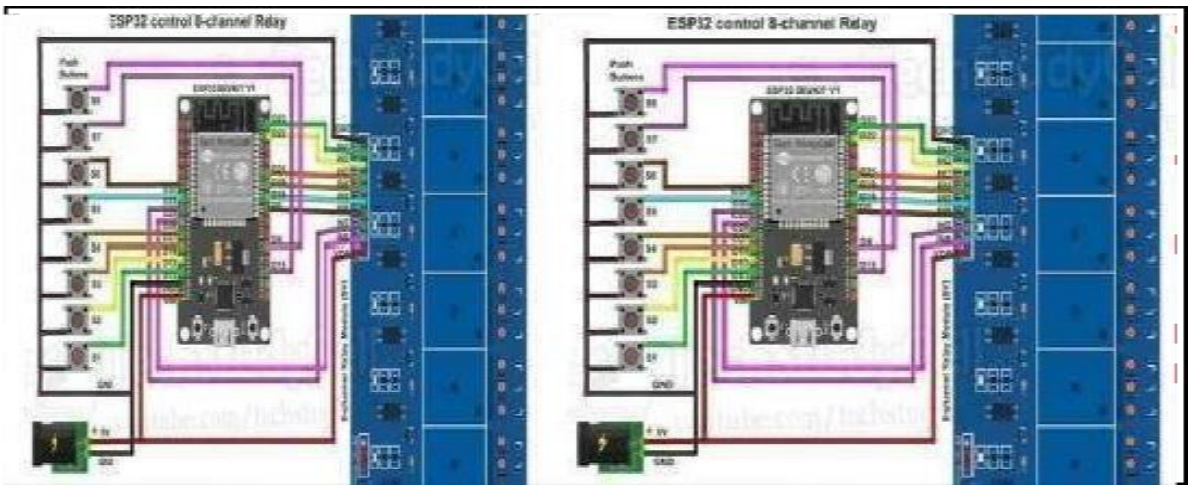

Fig2: Circuit Diagram

The above circuit diagram explains about connections between ESP32 Wi-Fi module ,4-channel relay and HL-link. When the user issues a command through alexa and google assistant. The alexa and google assistant receive the command and send to the ESP32 Wi-Fi module. And it analysis received commands and control the respective devices via relays. Relays Used to switch ON/OFF the classroom appliances based on commands received from the ESP32 Wi-Fi module. 4- channel Relays require 5V DC for operation, which is provided by the HL-link. It converts the AC supply (230V, 50Hz) to 5V DC. This 5V DC supply Powers the ESP32 and provides the required 5V for relay operation.

RESULTS

The implementation of a smart classroom integrating Google Assistant and Alexa, alongside hardware components like the four-channel relay, HL link and ESP32 Wi-Fi module, offers a dynamic and interactive learning environment such as quizzes, announcements, language translation, and quick access to educational resources like Wikipedia. Through voice commands via Google Assistant and Alexa, students and instructors can control various classroom functionalities effortlessly, enhancing efficiency and engagement. The four-channel relay, HL link serves as a bridge between the digital assistants and physical devices, allowing for seamless integration and automation of tasks such as controlling lights and other equipment. The ESP32 Wi-Fi module enables connectivity and communication between the hardware components, ensuring smooth

operation and real-time data exchange. Additionally, the system can be accessed and managed remotely via a dedicated mobile app like Cadio, voice assistant offering flexibility and convenience to users. Furthermore, the inclusion of an IR remote provides an alternative control method, catering to different preferences and accessibility needs. Overall, the integration of these technologies fosters an innovative and interactive learning environment, optimizing classroom management and enhancing the learning experience for both students and instructors.

- **BY USING ALEXA AND GOOGLE ASSISTANT:**

Fig 3: Input Command not Given

Fig 3, Shows that the input command (Voice command through the Alexa or Google Assistant) is not given to the smart classroom system.so, that the system was be initially Turn OFF.

Fig 4: Input Command Given

Fig 4, Shows that the input command (Voice command through the Alexa or Google Assistant) is given to the smart classroom system.so, that the system will be Turn ON.

- **BY USING CADIO APPLICATION:**

http://doi.org/10.36893/JNAO.2024.V15I1N01.369-377

Fig:5 Input Command not Given

Fig 5, Shows that the input command through the Cadio application (Mobile application) is not given to the smart classroom system.so, that the system will be Turn OFF.

Fig:6 Input Command Given

Fig 6, Shows that the input command through the Cadio application (Mobile application) is given to the smart classroom system.so, that the system will be Turn OFF.

- By using IR Remote we can control the smart classroom appliances

CONCLUSION

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Fig 7: Smart Classroom

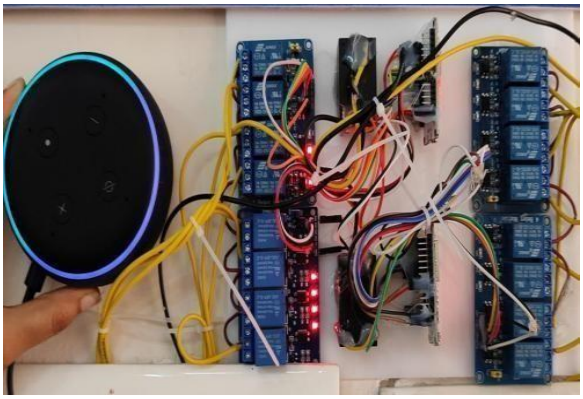

Fig 8: Hardware Setup

The article "SMART CLASSROOM BY USING ALEXA AND GOOGLE ASSISTANT" represents a significant advancement in the realm of educational technology. By seamlessly integrating voice commands, scheduling features, and remote controls, it streamlines classroom management, enhances energy efficiency, and promotes cost savings. Moreover, its reliance on wireless technologies like Wi-Fi and Bluetooth underscore its adaptability to the evolving landscape of smart classrooms as shown in the Fig.7,and In the Fig.8, It shows the Hardware setup of the system in the classroom. This article not only addresses the pressing issue of energy consumption in educational settings but also sets a precedent for creating more comfortable and user-friendly learning environments. As technology continues to advance, solutions like these will play an increasingly vital role in shaping the future of education, making classrooms smarter, more efficient, and better suited to the needs of modern learners and educators alike.

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