

A Digital Notice Board for Smart Classroom Using IoT

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ABSTRACT: Our electronic notice board offers a solution to the issues commonly faced by wooden or traditional notice boards. With its implementation, passing notices becomes simpler and more effective. The internet serves as our medium for information transport, as its popularity makes it easily accessible. The Internet of Things (IoT) facilitates the connection and data interchange of physical objects, automobiles, home appliances, and other items having electronics and software incorporated in them. Each device has a distinctive identity of the possibility for interoperability inside the current internet infrastructure through its embedded computer system. We built a username and password authentication system to maintain security, through its embedded computing system, allowing interoperability within the existing internet infrastructure. which allows only authorized personnel to send information. Our system's heart is the Node MCU, which interfaces with a monitor to display text, images, and videos on large-screen televisions. Our main objective is to attract more individual's focus on the display, which we achieve through high-definition display devices. Unlike conventional notice boards that only display text messages, In addition to text messages our system can display photos, videos, and audios. Educational institutions often require information to be presented in image or PDF format, making our system making our system easier to utilise. Utilising the internet allows senders to transmit communications anywhere in the globe without regard to distance, facilitating effective information sharing.

KEYWORDS: IoT, Smart Notice Board, Node MCU, Android

I. INTRODUCTION

Notice boards are an important means of gathering information in our day-to-day lives, found in various locations such as education facilities, train terminals, malls, bus stops, and offices. They serve as a platform to display public information, including advertising events, announcing news, and drawing attention to important matters. With the rise of digital technology, it has become more efficient to present information on digital devices. In the present era, the internet serves as the primary mode of communication everywhere. Notice boards play a crucial role in conveying

messages in any organization, and to achieve sustainable practices, it is imperative to use digital media instead of conventional medium such as printing on paper.

There are a few potential disadvantages of using wooden noticeboards in institutions: Durability: Wooden noticeboards may not be as durable as noticeboards made from other materials such as metal or plastic. Over time, they may become damaged or warped due to exposure to moisture or other environmental factors. Maintenance: Wooden noticeboards may require more maintenance than other types of noticeboards. They may need to be sanded and repainted periodically to maintain their appearance and prevent deterioration.

Fire risk: Wooden noticeboards can be a fire hazard if they are not properly treated or if they are located in areas where there is a high risk of fire. This is particularly important in institutions such as schools where the safety of students and staff is paramount. Limited customization: Wooden noticeboards may not offer as much flexibility in terms of customization as other materials. For example, it may be more difficult to add additional features such as lighting or digital displays to a wooden noticeboard. Cost: Wooden noticeboards can be more expensive than other types of noticeboards, particularly if they are made from high-quality wood or are custom-made.

There are initiatives that try to usher in the era of real-time notice. Writing the message to be shown on a mobile device and delivering it as an SMS to the other side is what it is about. Wireless Notice Board [1]. Some projects involve an advance notice board. To make it simpler for users to converse and post messages on the noticeboard using their mobile phones, it provides an SMS-based notice board that combines the well-known GSM. Its operation is based on a microcontroller AT89c52 that has been assembled language-programmed. Smart Notice Board [2]. There is also a low-cost Arduino UNO microcontroller board interfaced with a straightforward and affordable system for a portable noticeboard powered by Android that is designed to remotely transmit the desired information quickly to the target customers. Development of Simple and Low-cost Android-Based Wireless Notice Board [3]. There is system through wireless transmit notices on a notice board using Wi-fi. Wi-fi can transmit information over a distance of around 100 metres. The data rate for Wi-Fi is 1 or 2 Mbps. It connects to a variety of point and support network interfaces. It also enables the system to function with a variety of wireless devices. explains the LCD display powered by Wi-fi. Smart Notice Board [4]. So rather than all this we come with extra features to our system.

This paper presents a Smart Notice Board designed for a college, utilizing the Node MCU. With this project, an administrator or teacher can remotely convey messages or notices to the classrooms, thus reducing resources like and time and labour. The proposed system not only displays messages in different forms, such as text, audio, or video, but also delivers them through a speaker, making it accessible for visually-impaired individuals. Furthermore, the administrator or teacher can monitor the classroom via an android app using cameras placed in each classroom, and also control the electrical equipment like fans and lights within the class.

II. RELATED WORK

Notice boards are an essential aspect of our daily lives, and by transitioning from conventional notice boards to digital ones, we can make the process of disseminating information in a paperless setting simpler. The main intention of the smart notice board system is to build a portable LCD projector that can show messages in a number of forms, including text, graphics, and PDF files. The Raspberry Pi will serve as the system's processor. This feature allows messages to be displayed and changed easily from any part of the world. Implementation of Digital Notice Board Using Raspberry Pi and IoT [5]. Several projects have been implemented utilising technology such as a Raspberry Pi to create smart notice boards capable of conveying messages and notices remotely, reducing the resources required, such as manpower and time. Smart Notice Board [6].

To ensure remote display capabilities, one project used a multiuser password-protected SMS-based system with an LCD display device. Another project used a Raspberry-Pi single board computer and a continuously running Python script to create an affordable and self-regulating digital notice board. Password Protected Multiuser Wireless Electronic Noticing System by GSM with Robust Algorithm [7]. A GSM SIM900 module was also used in a GSM-based smart home and digital message board project to provide users with a simple, rapid, and reliable means to post important notices on an LCD. Cost-Effective and Self-Regulating Digital Noticeboard Systems [8]. In some projects, such as the Internet of Things-based intelligent noticeboard for urban planning, information is shown on a liquid crystal display using a web server. GSM-Based Smart Home and Digital Notice Board [9]. If the administrator provides any

information, via a webserver, the liquid crystal screen will show it.. IoT Based Smart Notice Board for Smart Cities [10].

Textual translation technology is used in some projects for dialogue. A sophisticated mobile application must be used by a client to transmit a message or piece of data. The message or data is obtained by the Esp-32 Wi-Fi module, which then sends it to Arduino. Finally, after data has been transmitted ranging from the Arduino to dot matrix display, a message or piece of information will appear on it. The previous message will keep appearing on the Dot Matrix Display until a new one is provided to the user. Digital Notice Board Operated via Speech [11]. Instead of the antiquated habit of posting notices on notice boards, Arduino and Bluetooth can be combined to construct a mobile notification board that sends messages via SMS almost promptly and reliably. Bluetooth-Based Wireless Notice Board using Arduino [12].

The technological advancement of the announcement board is proposed that will help in saving time and resources and making the information available instantly to the intended person. The system is simple, low cost and simple to use that interacts with the intended users instantly. rapid data transport capabilities, quick setup, and upkeep. Along with the notice messages, date and time is displayed. People choose wireless connections because they can readily interact with others and because they take up less time. A common technique called wireless enables electrical tools for interacting with one another without the need for any physical media to be connected between them. The user can transmit a variety of messages, and those messages can be displayed in an emergency.

III. METHODOLOGY

A digital noticeboard for classroom is a digital screen such as a TV monitor is to communicate with students. It will introduce a modern method of effectively and easily disseminating alerts. This system can share any type of media; images, presentations, videos and audios. The system saves time. Admin/teachers can add messages on the message board easily from anywhere using their android phone and they can view class rooms also. The devices in a class room are under admin’s control. The system also provide automation of electronic devices in study hall based on the count of entries to the classroom.

Admin can login to system using android application. Then registration process is carried and teacher can view classroom where they can send messages. The notice can be in form of audio, video, image or any.

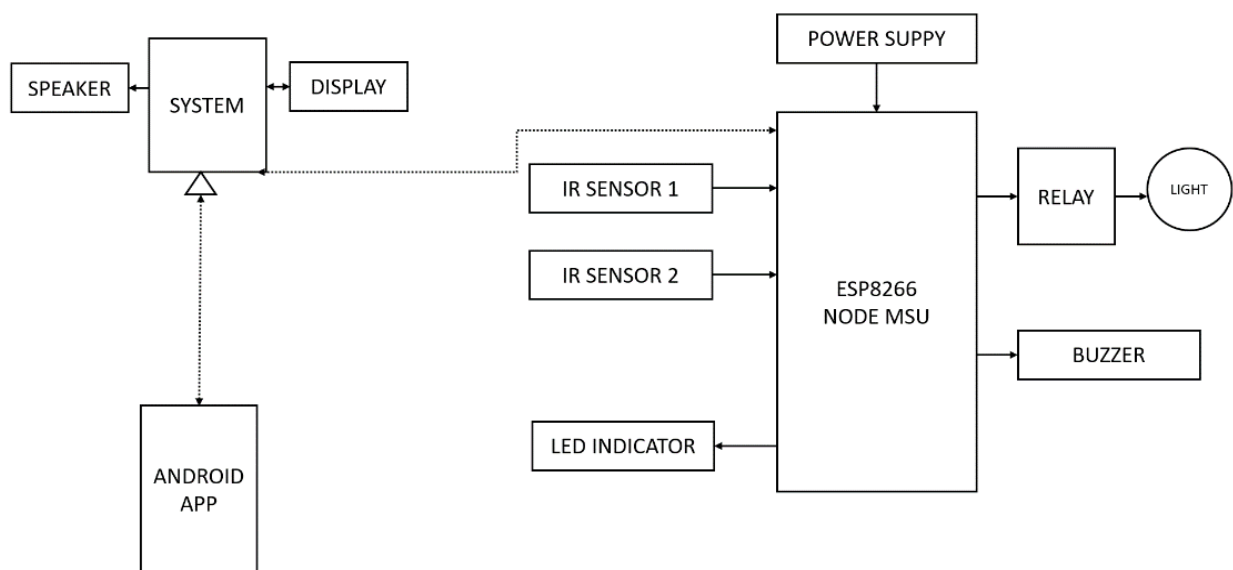


Fig. 1 Architecture of proposed system



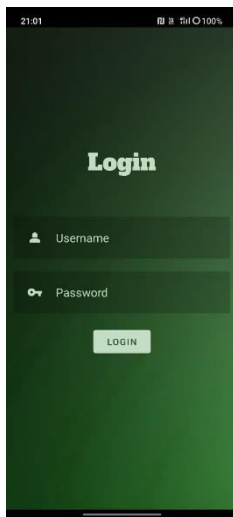
The figure(fig.1) shows the architecture of proposed system. The diagram contains two sections such as hardware and software. The software section contains android application which helps the user to send messages. The message will be display on the display of the system. The next part is for the automation which helps to automate the classroom according to the entries and exits. The main component of the hardware part is NODE MCU .The PCB also contains two IR sensors , buzzer , relay and lamp.

A digital noticeboard designed for classrooms is essentially a digital screen, like a TV monitor, that serves as a purpose for communicating with students. It provides an advanced and more efficient way of sharing important notices, announcements, and updates. This system can share various types of media such as images, presentations, videos, and audios. The main advantage of this system is that it saves time, as administrators and teachers can easily add messages to the noticeboard from anywhere using their Android phone. In addition, they can also view the classrooms and control devices within the classroom remotely.

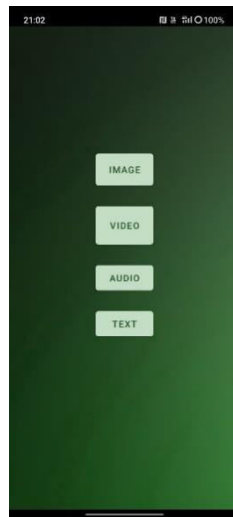
The system has been created to automate electronic devices in the classroom based on the number of entries to the classroom. Using an Android app, the administrator can quickly log in to the system after which the registration process is carried out. Teachers can then view their respective classrooms and send messages using any type of media files, including audio, video, images. Overall, a digital noticeboard for classrooms provides an efficient way of communicating with students, saving time and effort in the process.

IV. EXPERIMENTAL RESULTS

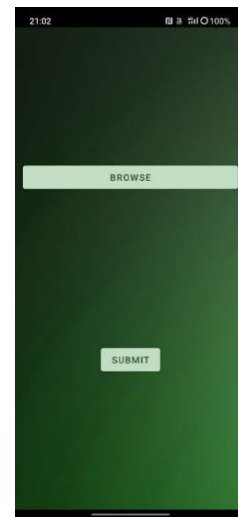
Figs shows an android application will be provided to Teachers, and they can access the server with their unique username and password. User can add text files, video files, or audio files and images to the database.



(a)



(b)

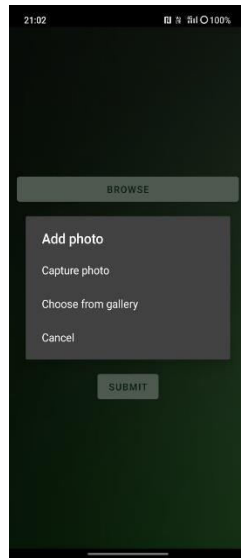


(c)

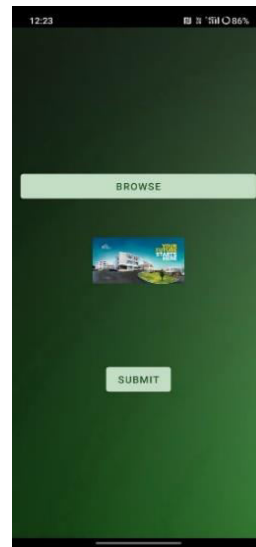


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(d)



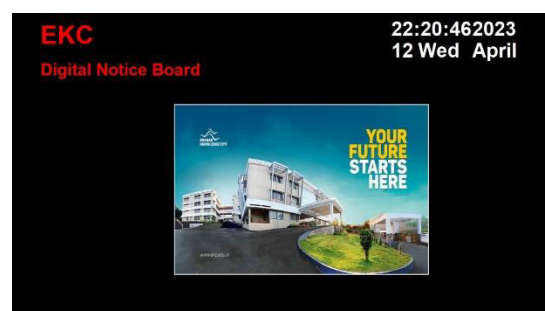
(e)

Fig. 2 Activity windows of android application (a) shows the image of the login page. (b) shows the image of uploading option page. (c) shows the image of page for brows the message. (d) shows image of browsing option page. (e) shows the page for upload message.

These are the activity windows of the mobile application. The fig.2(a) is the window that allow the users to login into the application by giving their unique username and password. After login activity the page will be directed to the next page (fig.2(b)) that shows the options for the information to be send. The next window (fig.2(c)) shows the browsing option so that we can select images, videos, audios from device according to the selected option. There is option for images and videos to capture or select from device. After selecting the message we can submit (fig.2(d)).



(a)

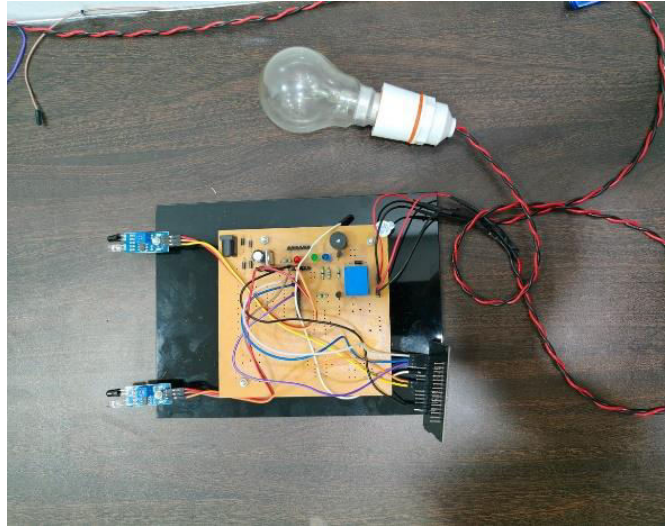


(b)

Fig. 3 Digital notice board (a) shows the image of display of text message (b) Image of display of image as message

After adding these files, students will be informed. An announcement is used to get the students attention. After that, the files will be played or displayed with the assistance of a monitor.

The figure (fig.3) shows the portable noticeboard. While submitting the message the students will be informed by an announcement to get the attention. Then the message will be presented on the board. The notice board will displays the time and date also.



(a)

Fig. 4 Hardware setup (a)Automation for smart classroom

The figure(fig.4) shows the hardware the system's setup. It is an add on part to automate the classroom. The main component is the Node MCU ESP8266.The PCB is equipped with two IR sensors to track students' entrances and exits. The electronic equipment will be turn ON during the entry of first person and will be turn OFF after the last person leave from the classroom.

NodeMCU is an affordable development board and firmware solution that employs the ESP8266 Wi-Fi chip. Its open-source design gives consumers the ability to link their gadgets to the internet and operate them from a distance. Lua scripting language is utilized for programming NodeMCU, which is simple enough for beginners to use. The USB interface on the NodeMCU development board enables easy programming and code uploading. The low cost, ease of use, and Wi-Fi connectivity of NodeMCU have contributed to its widespread used on Internet of Things (IoT) applications such as sensor monitoring, home automation, and device remote control.

An IR sensor is an electronic gadget that is utilized to detect and measure infrared radiation emitted by objects. These sensors are equipped with a specialized detector circuit that can recognize IR radiation, which is then transformed into an electrical signal. IR sensors have an extensive range of applications, such as temperature measurement, flame detection, motion detection, and distance sensing. When it comes to electronics, IR sensors are widely used in automatic doors, security systems, and remote controls. Moreover, IR sensors are utilized in industrial manufacturing processes to observe temperature and identify gas leaks. To summarize, IR sensors have a vital function in recognizing and measuring IR radiation and are implemented in numerous fields.

V. CONCLUSION

In today's world, digitalization is rapidly advancing, and it requires us to adopt new techniques to upgrade the previously used systems. Wireless technology offers quick data transmission over long ranges, which saves time, reduces cable costs, and increases the system's compatibility.

Our technology leverages using the web as a communication channel, allowing for unfettered coverage, in contrast to previous notice boards employing WiFi, which had coverage area restrictions. The ability to keep multi-media data and messages stored on a chip or SD card allows for faster and higher-quality retrieval of these types of data.

Digital noticeboards have many advantages over conventional noticeboards,including:Dynamic content: Digital noticeboards allow for the easy and flexible display of dynamic content such as videos, animations, and interactive media. This can make the display more engaging and informative.Real-time updates: Digital noticeboards can be

updated in real-time, allowing for instant communication of important information or changes. This is particularly useful in emergency situations or time-sensitive events.

Customization: Digital noticeboards offer a high customization, allowing users to tailor the display to their specific needs. For example, they can display different content at different times of the day, or display content based on user location or preferences. **Remote management:** Digital noticeboards can be managed remotely, allowing for easy updates and maintenance without the need for physical access to the board. This can save time and resources, particularly in large institutions or organizations. **Environmental friendliness:** Digital noticeboards are more environmentally friendly than traditional noticeboards, as they do not require paper or other physical materials. This can also save costs associated with printing and paper waste.

Overall, digital noticeboards offer many advantages over conventional noticeboards, including dynamic content, real-time updates, customization, remote management, and environmental friendliness. They are an excellent choice for institutions that require a high flexibility, efficiency, and modernity in their communication strategies. The benefits of our system include its ability to store and display multimedia data, and its use of the internet for unrestricted communication. These features enable the system to meet the increasing demand for digitalization and improve the efficiency of notice boards .

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