

Smart Wireless Notice Board Using Raspberry Pi and Android App

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ABSTRACT

This project presents the design and implementation of a Smart Wireless Notice Board using a Raspberry Pi integrated with an Android application. The system aims to replace traditional paper-based notice boards with a digital, efficient, and eco-friendly solution. Administrators can remotely send notices through the Android app, which are transmitted via the internet to the Raspberry Pi. The Raspberry Pi processes the received data and displays the information on a connected screen in real time. This eliminates the need for manual updating and ensures instant communication across institutions such as colleges, offices, and public spaces. The system supports text-based announcements and can be extended to include images and multimedia content. It enhances accessibility, reduces paper usage, and improves information management. Additionally, the user-friendly interface of the Android app allows easy control and scheduling of notices. Overall, this project demonstrates a cost-effective and scalable approach to modern communication systems, combining IoT technology with mobile computing to provide a reliable and efficient digital notice solution.

KEYWORDS: Wireless Communication, Real-Time Display Updates, Remote Accessibility, Cost-Effective Automation.

INTRODUCTION

In today's fast-paced digital world, the need for efficient and real-time communication systems has become increasingly important, especially in institutions such as schools, colleges, offices, and public places. Traditional notice boards, which rely on printed paper notices, are time-consuming, less flexible, and require manual effort for updating information. These limitations often lead to delays in communication, increased paper wastage, and difficulty in managing large volumes of notices. To overcome these challenges, a Smart Wireless Notice Board system using a Raspberry Pi and an Android application is proposed.

The Raspberry Pi, a compact and cost-effective computing device, plays a crucial role in this system by acting as the central processing unit. It receives data wirelessly from the Android application through the internet or local network. The Android application serves as a user-friendly interface that allows

administrators to create, edit, and send notices instantly from anywhere. Once the notice is sent, it is processed by the Raspberry Pi and displayed on a connected screen in real time, ensuring quick dissemination of information.

This system eliminates the need for physical presence to update notices and significantly reduces the use of paper, making it an eco-friendly solution. It also enhances communication efficiency by enabling instant updates and remote access. Furthermore, the system can be expanded to support multimedia content such as images and videos, increasing its effectiveness and usability.

Overall, the Smart Wireless Notice Board represents a modern approach to information sharing by integrating Internet of Things (IoT) technology with mobile applications, offering a reliable, scalable, and efficient communication platform.

LITERATURE SURVEY

Author Prashant Singh[1] presents a smart wireless notice board system using IoT technology to improve communication efficiency in institutions. The system uses Raspberry Pi as the main controller and Wi-Fi

module for data transmission. The author focuses on reducing manual effort by allowing notices to be sent remotely through a web or mobile interface. The system displays real-time messages on an LCD screen and supports quick updates. However, the study highlights challenges such as network dependency and security risks in wireless communication. Future work suggests

adding encryption techniques and multimedia support for better functionality.

Author [2] proposes an Android-based wireless notice board system integrated with Raspberry Pi. In this system, the Android application acts as the user interface, allowing administrators to send notices directly to the display unit. The data is transmitted through the internet and processed by Raspberry Pi, which displays it instantly. The system is designed to be user-friendly and cost-effective. The author compares this system with traditional notice boards and concludes that it provides faster communication and reduces paper usage significantly.

In Paper [3], the author presents an IoT-based smart notice board using cloud technology. The system uses Raspberry Pi connected to a cloud server, where notices are uploaded and stored. The display unit fetches data from the cloud and updates automatically. This approach ensures accessibility from anywhere and enables centralized control of multiple notice boards. The study also discusses scalability and highlights that cloud integration improves system flexibility and reliability.

Paper [4] introduces a GSM-based wireless notice board system. The system allows users to send notices via SMS, which are then displayed on an LED screen. Although this system does not require internet connectivity, it is limited in terms of message length and lacks multimedia support. The author concludes that GSM-based systems are suitable for areas with limited internet access but are less efficient compared to IoT-based solutions.

Author [5] explains the use of Bluetooth technology for short-range wireless notice board communication. The system allows users to send messages from a mobile device to a display unit within a limited range. While the system is simple and cost-effective, it lacks remote accessibility. The study suggests that integrating Bluetooth with internet-based technologies can improve performance and usability.

Akshay Vaja [6] discusses an advanced IoT-based notice board system that supports multimedia content

such as images and videos. The system uses Raspberry Pi with a high-resolution display and allows users to upload content through a mobile application. The author highlights that this system enhances user engagement and improves communication effectiveness. However, it requires higher processing power and better network bandwidth.

Paper [7] focuses on the security aspects of wireless notice board systems. The author proposes authentication mechanisms such as login credentials and encrypted communication to prevent unauthorized access. The system ensures that only authorized users can send or modify notices. The study emphasizes the importance of data security in IoT-based communication systems.

Paper [8] presents a voice-controlled smart notice board system using speech recognition technology. Users can send notices using voice commands, which are processed and displayed on the screen. This system improves accessibility, especially for users with disabilities. The author suggests that combining voice recognition with mobile applications can further enhance system usability.

Paper [9] introduces a hybrid system combining Raspberry Pi and Arduino for improved performance. Arduino handles sensor-based inputs while Raspberry Pi manages data processing and display. The system supports real-time updates and is designed for energy efficiency. The study highlights that hybrid systems can provide better performance and flexibility.

Paper [10] presents a fully automated smart notice board system using Android and IoT integration. The system allows scheduling of notices, real-time updates, and remote monitoring. The author concludes that such systems can significantly improve communication in educational institutions and corporate environments. Future work includes integrating artificial intelligence for automated content management and personalized notifications.

IMPLEMENTATION METHODOLOGY

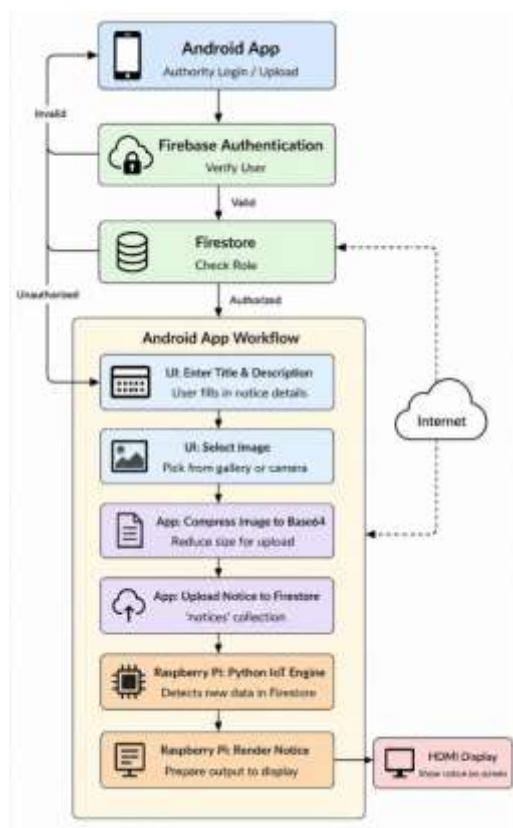


Fig1: Flow chart of design and implementation

The flowchart explains the working process of the Smart Wireless Notice Board system. It starts with the authority user logging into the Android application and uploading the notice details. The system first performs Firebase Authentication to verify whether the user is valid. If the login is invalid, the process stops and access is denied. After successful authentication, Firestore checks the user's role to confirm whether the person is authorized to upload notices. If the role is not authorized, the process does not continue further. Once authorization is completed, the Android app workflow begins. The user enters the title and description of the notice, selects an image if required, and the app compresses the image into Base64 format to reduce its size for easy uploading. The notice is then uploaded to the Firestore database through the internet. The Raspberry Pi, running a Python-based IoT engine, continuously monitors Firestore for new notices. Finally, The notice is displayed.

BLOCK DIAGRAM OF A SYSTEM

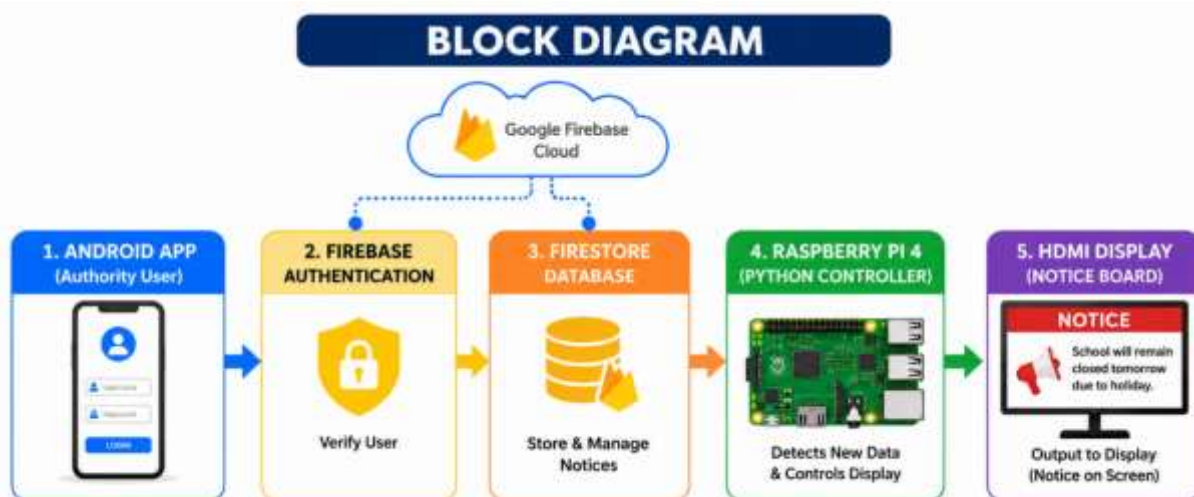


Fig2: Block Diagram of System

The Smart Wireless Notice Board system begins with an authorized user creating and uploading a notice through the Android application. This application acts as the primary interface for the administrator, allowing them to add announcements, event details, circulars, updates, or other important messages in a simple and convenient way. Instead of manually writing and displaying paper notices, the user can manage everything digitally through the mobile app, which makes the system faster, easier to use, and more

efficient. Once the notice is submitted, the system first performs user verification through Firebase Authentication. This block ensures that only authorized users are allowed to access the application and upload notices. By providing secure login and user validation, it prevents unauthorized access and protects the system from misuse. This authentication layer improves the reliability and security of the notice board system.

After successful authentication, the notice content is stored in the Firestore Database, which acts as the cloud storage unit of the project. Firestore

stores the notice details, updates, and other related information in real time. Because it is cloud-based, it allows notices to be uploaded and managed remotely from anywhere with internet access. It also helps maintain proper storage and synchronization of the latest notices.

The Raspberry Pi 4 works as the main processing and controlling unit of the system. It continuously monitors the Firestore database for newly uploaded or modified notices. Whenever a new notice is available, the Raspberry Pi fetches the content, processes it, and converts it into a suitable format for presentation on the display. It acts as the bridge between the cloud database and the physical display hardware. Finally, the processed notice is sent to the HDMI Display, which functions as the digital notice board. The display shows the latest notice instantly on the screen, ensuring real-time communication. Overall, this system is paperless, secure, user-friendly, efficient, and highly useful for colleges, schools, offices, and public information boards.

SIMULATION RESULT AND ANALYSIS

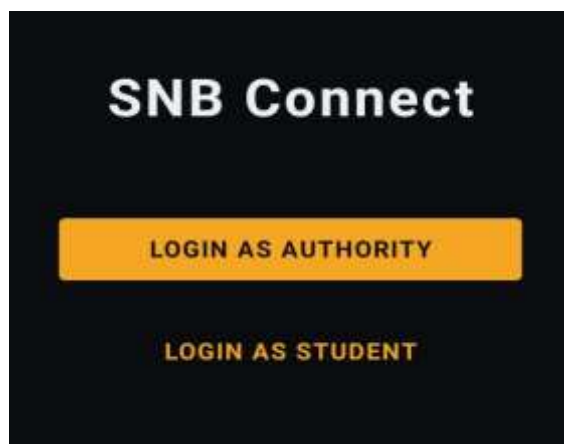


Fig3.1 Login Page.

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Fig.3.1 Login screen of the SNB Connect application providing two authentication options: Authority Login for notice management and Student Login for viewing published notices. Users can select the appropriate login option based on their role.

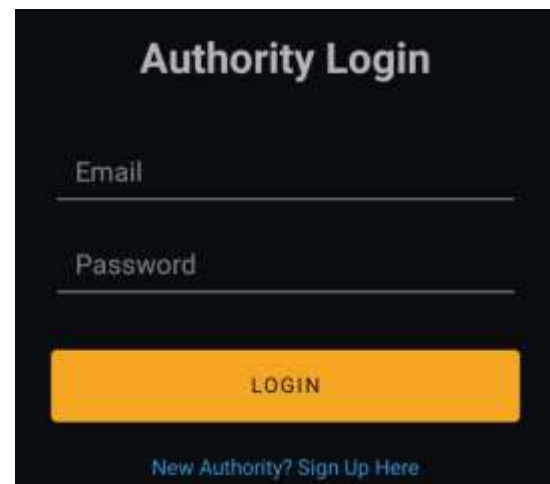


Fig3.2 Authority Login Interface

Fig.3.2 Authority Login Interface. Existing authorities can enter their registered email address and password to access the system. New users must first complete the registration process before logging in to manage and publish notices

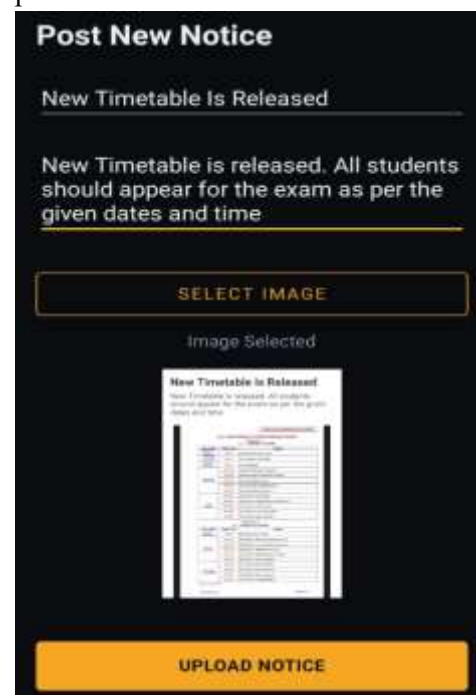


Fig.3.3 After Login as Authority

Fig.3.3 Notice Creation Interface. After successful authority login, the user can create a new notice by entering the notice title and description, selecting an image or document attachment, and uploading the notice. The uploaded notice is then stored in the system and made available for viewing on the digital notice

board and student application.

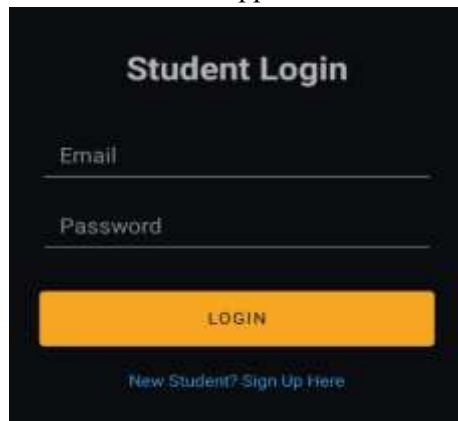


Fig.3.4 Student Login Interface

Fig.3.4 Shows the student login interface, if you are a previous user then use details to login and if you are a new user then register first.

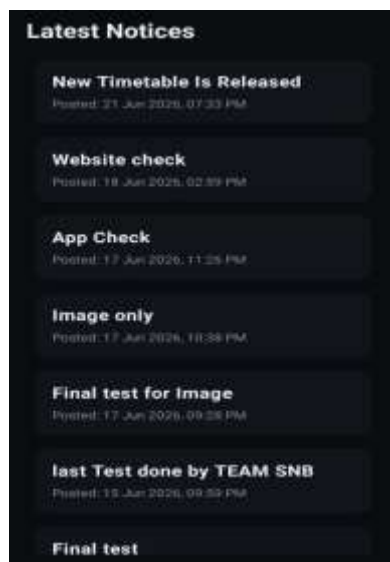


Fig.3.5 Interface After Login as Student

Fig.3.5 Student dashboard displaying the list of published notices after successful login. Students can select any notice from the list to view its complete details and associated attachments.

New Timetable Is Released

New Timetable is released. All students should appear for the exam as per the given dates and time



The image shows a detailed notice screen with a title 'New Timetable Is Released' and a subtitle 'New Timetable is released. All students should appear for the exam as per the given dates and time'. Below the text is a table with columns for 'Date & Time', 'Exam Name', and 'Subject'. The table lists various exams and their corresponding dates and times. Below the table is a link that says 'Click here to download the timetable'.

Fig.3.6 Final Notice Displayed in app

Fig.3.6 Detailed notice screen displaying the published timetable notice with its attached document for easy access and reading..



Fig. 4 Final Circuit and Notice Board

Fig.4 Experimental setup showing the Raspberry Pi-based notice board system and the published notice displayed on the monitor.

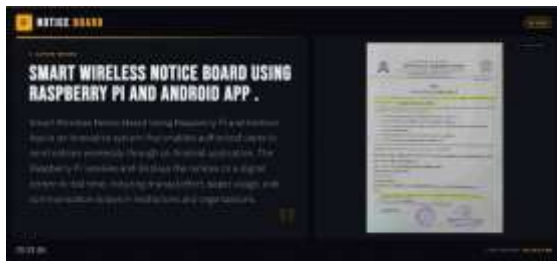


Fig.5 Final Notice Displayed on display

Fig. 5: Final output showing the notice published through the Android application and displayed on the digital notice board.

CONCLUSION

The project on Smart Wireless Notice Board using Raspberry Pi and an Android app offers a practical and modern way to share information quickly and efficiently. It removes the need for manual updates and reduces paper usage, making it both convenient and eco-friendly. The system allows notices to be sent instantly from anywhere, ensuring better communication in places like colleges and offices. Its simple design and real-time performance make it reliable for everyday use. Although it depends on internet connectivity, it still proves to be a cost-effective and scalable solution that can be improved further with advanced features in the future.

FUTURE SCOPE

In the future, this system can be enhanced by adding multimedia support like videos and animations, improving security with advanced authentication, and integrating AI for smart scheduling. It can also support multiple displays remotely and work offline, making it more efficient, flexible, and suitable for larger organizations.

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