Smart AI Notice Board

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Abstract: *Traditional notice boards require manual effort and are time-consuming to update, which may lead to delayed information delivery. The Smart AI Notice Board is an automated and intelligent digital display system that uses Internet of Things (IoT) and Artificial Intelligence (AI) technologies to publish notices in real time. The system allows users to upload notices through a web-based interface or voice input, which are then processed and displayed instantly on digital screens. The proposed system improves communication efficiency, reduces human effort, and ensures timely information dissemination. This project is suitable for educational institutions, offices, hospitals, and public places where quick and reliable communication is required*

Keywords: Smart Notice Board, Internet of Things (IoT), Artificial Intelligence, Digital Display, Automation

I. INTRODUCTION

Notice boards are widely used for sharing important information in colleges, offices, and public places. Conventional notice boards rely on paper notices, which are difficult to manage and update frequently. To overcome these limitations, a Smart AI Notice Board system is proposed. This system automates the notice publishing process using IoT and AI technologies. Notices can be uploaded remotely and displayed instantly, making communication faster and more effective.

II. LITERATURE REVIEW

In recent years, research in information dissemination systems has increasingly focused on automation, real-time updates, and user accessibility. Traditional notice boards are static and rely on manual intervention for content updates, which causes delays and inefficiencies. To address these limitations, digital notice boards have been proposed in various studies, with many leveraging Internet of Things (IoT) and embedded systems.

Sharma and Gupta (2020) explored an IoT-based digital notice board system that enabled remote updating of messages through a web interface. Their system utilized microcontroller-based display units to show notices, reducing the need for manual updates and minimizing errors commonly seen in paper-based systems. However, their approach lacked intelligent content processing and scalability for large campus environments.

Further advancements were made by Patel et al. (2021), who developed a cloud-connected notice display system integrated with real-time communication protocols. The system allowed multiple users to upload messages simultaneously, improving message dissemination across different departments. While this approach increased efficiency, it faced challenges with handling unstructured or inconsistent input formats.

With the advent of artificial intelligence (AI), researchers have incorporated AI modules into display systems to support automated content formatting and natural language processing. For example, Singh and Yadav (2022) introduced an AI-enhanced digital notice board that used NLP techniques to standardize and categorize uploaded notices. Their system improved content readability and organization, but further enhancements were recommended for voice-based input and multilingual support.

Another significant contribution in the field was made by Lee et al. (2023), who integrated voice command interfaces with IoT notice boards to facilitate hands-free operation. Their study demonstrated improved accessibility for users with mobility challenges. However, the system's dependency on accurate speech recognition limited performance in noisy environments.

Despite these advancements, existing research lacks a comprehensive solution that combines IoT connectivity, AI-based content processing, web and voice input methods, and real-time updates. The proposed Smart AI Notice Board system addresses this gap by integrating IoT for remote display control, AI for intelligent text validation and formatting, and flexible user input options including web dashboard and voice commands. This approach enhances user experience, reduces administrative workload, and ensures timely and efficient dissemination of information.

III. EXISTING SYSTEM

Website / Software System:

Existing systems use basic web portals or local computers to upload notices. These platforms allow only simple text display and do not support intelligent content processing, automation, or voice-based inputs.

Real-World Application:

In colleges, offices, and public places, notices are mostly updated manually on paper boards or through standalone digital displays. This causes delays, requires physical presence, and is not suitable for urgent or real-time communication.

Hardware System:

The hardware generally consists of LED/LCD display boards connected via USB or wired systems. These devices lack IoT connectivity, AI integration, and centralized control, limiting scalability and flexibility.

IV. PROPOSED SYSTEM

The proposed Smart AI Notice Board is an intelligent, automated information display system that integrates Internet of Things (IoT), Artificial Intelligence (AI), and web technologies to enable real-time, secure, and efficient notice dissemination. The system eliminates manual intervention and allows notices to be published instantly from remote locations.

1. Web-Based Notice Management

An authorized user accesses a centralized web dashboard using secure login credentials. Through this interface, notices can be created, edited, scheduled, and deleted. The system supports formatted text input and multimedia content, ensuring clear and professional notice presentation.

2. AI-Based Content Processing

The AI module processes the uploaded notice to validate text, correct basic grammatical errors, and format the content for optimal display. Natural Language Processing (NLP) techniques are used to standardize unstructured input, making notices readable and consistent. The AI module also enables voice-to-text conversion for hands-free notice creation.

3. IoT-Based Communication

Once the notice is approved, it is transmitted to the display unit using IoT communication protocols. A cloud or local server ensures reliable data transfer between the web application and hardware device. This enables real-time updates without requiring physical access to the notice board.

4. Hardware and Display Unit

The hardware unit consists of a microcontroller or single-board computer connected to an LED/LCD display. The controller receives data from the server and updates the display instantly. Optional audio modules announce notices through speakers, improving accessibility.

5. Real-Time Synchronization

The system supports instant synchronization between the server and multiple display units. Any update made on the web dashboard is reflected immediately on all connected notice boards, making it suitable for large campuses or organizations.

6. Security and Access Control

User authentication and role-based access control are implemented to prevent unauthorized notice publishing. Only approved users can upload or modify notices, ensuring data integrity and reliability.

7. Scalability and Flexibility

The proposed system is scalable and can be expanded to support multiple languages, mobile applications, and advanced analytics. It is adaptable for educational institutions, corporate offices, hospitals, transportation hubs, and smart cities.

V. METHODOLOGY

The methodology of the Smart AI Notice Board describes the step-by-step process involved in creating, processing, and displaying notices using web technologies, artificial intelligence, and IoT-enabled hardware. The system follows a structured workflow to ensure accurate, secure, and real-time information dissemination.

1. User Authentication and Access

Authorized users log in to the web-based dashboard using valid credentials. Role-based access control ensures that only permitted users can create, modify, or delete notices. This step prevents unauthorized access and maintains system security.

2. Notice Creation

After successful login, the user creates a notice using the web interface. The system supports text-based input and optional voice commands. Voice inputs are captured through a microphone and converted into text using AI-based speech-to-text processing.

3. AI-Based Content Processing

The entered notice is processed by the AI module, which performs:

- Text validation and error checking
- Basic grammar correction
- Formatting and layout optimization
- Removal of redundant or invalid content

Natural Language Processing (NLP) techniques are used to standardize the content for clear and readable display.

4. Notice Approval and Scheduling

Once processed, the notice can be reviewed and scheduled for immediate or future display. The system allows users to set priority levels for urgent notices, ensuring important messages are highlighted.

5. Server and Cloud Communication

The finalized notice is stored on a centralized server or cloud database. Using IoT communication protocols, the server transmits the notice data to connected display units. This enables remote and real-time updates without manual intervention.

6. Hardware Control and Display

The IoT-enabled hardware unit receives the notice data from the server. A microcontroller or single-board computer processes the information and updates the LED/LCD display accordingly. Optional audio modules generate voice announcements for enhanced accessibility.

7. Real-Time Synchronization

Any update made on the web dashboard is instantly synchronized with all connected notice boards. This ensures consistent information across multiple locations, making the system suitable for large campuses and organizations.

8. Monitoring and Maintenance

The system continuously monitors connectivity, display status, and data integrity. In case of errors or failures, alerts are generated for timely maintenance and troubleshooting.
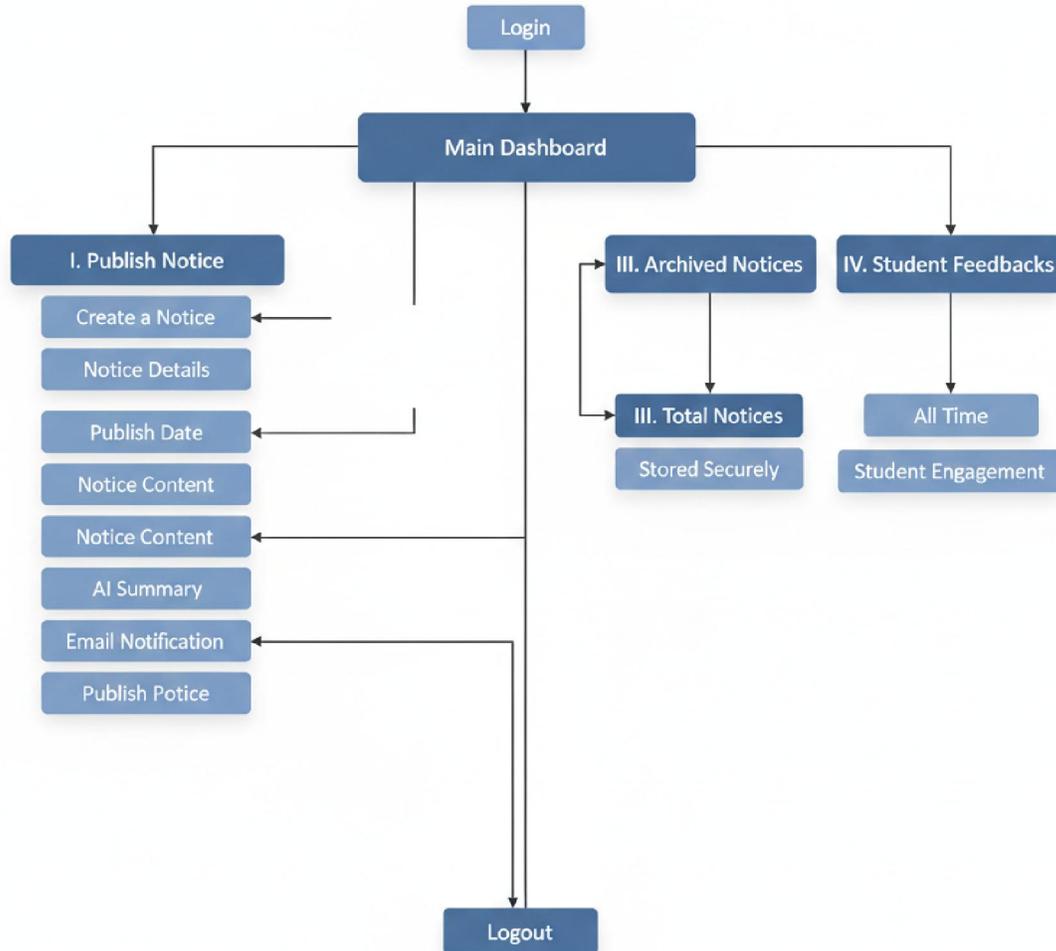
VI. FUTURE SCOPE

Mobile Application Integration:

A dedicated mobile application can be developed to allow users to receive notices instantly and manage notifications on smartphones.

Multi-Language Support:

The system can be enhanced to support multiple regional and international languages, improving accessibility for diverse users.

Advanced AI Analytics:

AI models can be used to analyze student engagement, predict notice reach, and recommend optimal publishing times.

Voice Assistant Integration:

Integration with voice assistants can enable hands-free notice creation and audio-based announcements.

Personalized Notice Delivery:

Notices can be customized based on user roles, departments, or interests for targeted communication.

Cloud Scalability:

Migrating to a fully cloud-based infrastructure will allow seamless scaling across multiple campuses or institutions.

Facial Recognition & Smart Access:

Facial recognition can be implemented to display personalized or priority notices based on viewer identity.

Integration with Smart Campus Systems:

The system can be connected with attendance, examination, and learning management systems for automated information flow.

VII. CONCLUSION

The Smart AI Notice Board presents an efficient and modern solution for automated information dissemination by integrating Artificial Intelligence, Internet of Things, and web technologies. The proposed system eliminates the limitations of traditional notice boards by enabling real-time notice creation, intelligent content summarization, automated email notifications, and centralized notice management. The system improves communication efficiency, reduces manual effort, and ensures timely delivery of important information to students. With its scalable architecture, secure access control, and user-friendly interface, the Smart AI Notice Board is highly suitable for educational institutions and smart campus environments. The project demonstrates strong feasibility, effectiveness, and potential for future enhancements, making it a valuable contribution to digital communication systems.

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