

Smart Digital Notice Board using Raspberry Pi

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Abstract—The Smart Digital Notice Board is an advanced communication system designed to replace traditional paper-based notice boards used in educational institutions and public places. Conventional notice boards require manual updates, consume large amounts of paper, and do not support real-time communication. To overcome these limitations, this system uses Raspberry Pi and a web-based application for efficient digital notice management.

The system utilizes Raspberry Pi 4 Model B as the core processing unit connected to a display screen through HDMI. A Flask-based web application allows authorized administrators to upload, manage, and delete notices remotely using mobile devices or computers over a Wi-Fi network. The system supports multimedia content such as images and videos, enabling dynamic and interactive communication.

The display is organized in a grid format with automatic sliding functionality. Additional features include scrolling ticker, emergency notice display, real-time clock, and full-screen kiosk mode. The system reduces paper usage, improves communication efficiency, and provides instant updates. It can be effectively used in colleges, railway stations, bus stations, metro stations, and other public places for awareness and information dissemination.

Index Terms—Digital Notice Board, Raspberry Pi, Flask, IoT, Real-Time Communication, Multimedia Display, Kiosk Mode, Smart Display System, Eco-Friendly System.

I. INTRODUCTION

Communication plays a crucial role in educational institutions, offices, and public places for sharing important information. Traditional notice boards are widely used but suffer from several limitations such as manual updates, time delays, paper wastage, and lack of real-time communication.

With the advancement of Internet of Things (IoT) and embedded systems, digital communication systems have become more efficient and reliable. The Smart Digital Notice Board is designed to overcome the drawbacks of traditional systems by providing a real-time, paperless, and user-friendly communication platform.

The system uses Raspberry Pi as the core processing unit and a Flask-based web application for managing notices. Administrators can upload notices remotely using mobile devices, and the system displays them instantly on a screen in an organized grid format. This system improves efficiency, reduces manual effort, and enhances communication.

II. OBJECTIVES

1. To develop a digital notice board using Raspberry Pi
2. To provide real-time notice updates
3. To support image and video display
4. To enable remote access using mobile or computer
5. To reduce paper usage and promote eco-friendly system

III. SYSTEM ARCHITECTURE

A. Components Used

Hardware:

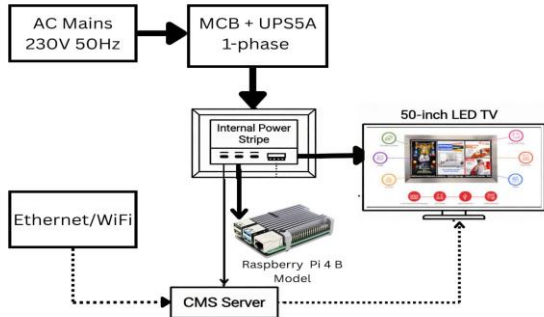
1. Raspberry Pi 4 Model B
2. LED Display (TV/Monitor)
3. HDMI Cable
4. Power Supply

Software:

1. Raspberry Pi OS
2. Python Programming

3. Flask Web Framework
4. HTML, CSS, JavaScript
5. Chromium Browser (Kiosk Mode)

B. Block Diagram



C. Working Principle

The working of the Smart Digital Notice Board starts when the admin logs into the system through a web application. The admin uploads notices in the form of images or videos using a mobile device or computer. These files are stored in the Raspberry Pi system.

The Raspberry Pi processes the data and displays it on the screen using a web browser in full-screen kiosk mode. The notices are displayed in a grid format with automatic sliding after a fixed time interval. The system also supports scrolling ticker and emergency notices for important information.

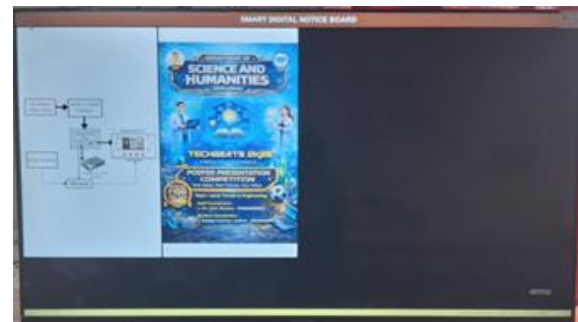
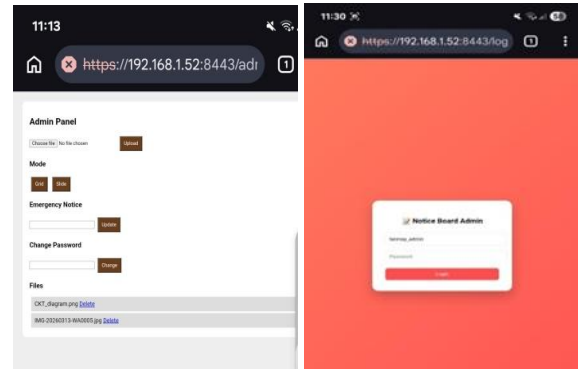
IV. METHODOLOGY

1. System Setup – Raspberry Pi is connected to display and configured
2. Software Installation – Flask and required libraries installed.
3. Web Application Development – Admin panel created using Flask
4. Authentication – Secure login system implemented
5. File Upload – Admin uploads images/videos
6. Storage – Files stored in local directory
7. Display System – Notices displayed on screen
8. Auto Slide – Notices change automatically after fixed time

V. RESULTS

This section presents the results obtained after the implementation of the Smart Digital Notice Board

system. The system was tested under real-time conditions using Raspberry Pi and a Flask-based web application to evaluate its performance, functionality, and reliability.



5.2 System Implementation Results

The Smart Digital Notice Board system was successfully developed and all major features were verified during testing.

5.1.1 Functional Results

- Admin login system works securely
- Image and video upload functionality is successful
- Notices are stored correctly in the system
- Display of notices is working properly
- Delete option is functioning correctly
- Grid display (4 notices per row) is working
- Auto-slide feature changes notices after fixed time
- Scrolling ticker is displayed continuously
- Full-screen kiosk mode works properly

5.2 Performance Analysis

5.2.1 System Speed

- Fast response during upload and display
- Notices appear almost instantly after upload
- No major delay observed

5.2.2 Display Performance

- Clear image display without distortion
- Smooth video playback
- Auto-size adjustment for A4/A3 notices
- Multiple notices handled efficiently

5.2.3 User Interface

- Admin panel is simple and easy to use
- Upload and delete operations are user-friendly
- Display interface looks professional

5.3 Testing Details

The system was tested under the following conditions:

- Tested on 1 to 4 display screens
- Connected through Wi-Fi network
- Verified upload, delete, and display features
- Checked auto-start after reboot
- Confirmed kiosk mode working

5.4 Reliability and Stability

- System runs continuously without crashing
- Auto-refresh ensures updated content
- Stable performance under normal conditions
- No major errors observed
- Works properly after system restart

5.5 Comparison with Traditional System

Feature	Traditional Notice Board	Smart Digital Notice Board:
Update Time :-	Manual & Slow	Instant
Paper Usage :-	High	Zero (Eco-friendly)
Content Type :-	Only paper	Image + Video
Accessibility :-	Limited	Remote
Management :-	Difficult	Easy

5.6 Real-Time Application Results

- Instant notice updates
- Better visibility of information
- Reduced manual effort
- Improved communication efficiency
- Suitable for colleges and public places

5.7 Limitations Observed

- Requires stable Wi-Fi
- Depends on power supply
- Tested only on small scale (1–4 displays)

- Storage limitation

VI. CONCLUSION

The Smart Digital Notice Board system has been successfully designed and implemented using Raspberry Pi and a Flask-based web application. The project effectively addresses the limitations of traditional notice boards by providing a modern, real-time, and paperless communication system. The system allows authorized administrators to upload and manage notices remotely using mobile devices or computers, making the process faster and more efficient.

The implementation of features such as grid-based display, automatic sliding of notices, multimedia support (images and videos), scrolling ticker, and full-screen kiosk mode enhances the overall functionality and user experience. The system ensures that multiple notices can be displayed in an organized and attractive manner without manual intervention. It also supports automatic size adjustment, making it suitable for different formats like A4 and A3 notices.

During testing, the system showed reliable performance with smooth operation, quick response time, and stable functionality. It was successfully tested on a small scale (1–4 displays), proving its practicality and effectiveness in real-world scenarios. The system significantly reduces paper usage, making it an eco-friendly solution, and minimizes manual effort required for updating notices.

Overall, the Smart Digital Notice Board provides a cost-effective, scalable, and user-friendly solution for communication in educational institutions and public places such as railway stations, bus stations, and metro stations. The project demonstrates how modern technologies like IoT, embedded systems, and web applications can be integrated to create efficient and sustainable communication systems.

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