

Gesture-Controlled Notice Board

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Abstract - A digital notice board is a cutting-edge solution that combines the traditional concept of a bulletin board with modern technology. This modern take on notice boards utilizes emerging technologies such as Internet of Things and Gesture Recognition to enhance the user experience and provide a seamless, interactive platform for sharing public messages, announcements, and important information. With the integration of these advanced technologies, digital notice boards are becoming increasingly prevalent in various settings, revolutionizing the way people interact with and consume information.

Keywords — *Digital Notice Board, Internet of Things, Gesture Recognition, Interactive Display*

I. INTRODUCTION

The modern notice board is a testament to the power of technology in revolutionizing the way we share and access information. This project aims to explore the concept of combining traditional bulletin boards with cutting-edge technologies such as Internet of Things and Gesture Recognition to create a seamless and interactive platform for sharing public messages, announcements and important information. Through this paper, we will delve into the benefits and potential applications of the modern notice board, showcasing its increasing prevalence in various settings and its impact on the way we interact with information.

The modern notice board project will provide a unique and innovative solution to the challenges faced by traditional bulletin boards in terms of information dissemination. By incorporating Internet of Things and Gesture Recognition technologies, the modern notice board will offer an interactive and user-friendly platform for students and staff to access important information and announcements in real-time [1].

The implementation of the modern notice board in a college institution will enhance the communication and information flow between students, staff, and the administration. This will result in a more informed and engaged community, leading to improved decision-making and a more efficient use of resources.

This paper will explore the technical aspects of modern notice boards and their integration with existing systems in a college institution. The paper will highlight the challenges faced in the implementation and offer possible solutions to overcome these challenges.

II. LITERATURE REVIEW

A number of key studies were identified that contribute to the understanding of the use of technology

in public information dissemination, including modern notice boards in academic settings.

One study that addresses the interactive digital notice board concept is the "Interactive Digital Notice Board" presented at an IEEE conference [2]. It describes the development of a Digital Signage-based system controlled by a web server that displays announcements, date, time, and temperature on the screen. The study also introduces an innovative approach to the system with an interactive age classification using a deep learning method. The proposed system contributes to the concept of designing an interactive digital notice board based on the Internet of Everything.

In the paper titled "IoT Based Digital Signage Board Using Raspberry Pi 3", the authors propose a system that integrates the Internet of Things (IoT) and digital signage boards to enable remote access and control using the internet [3]. The system aims to enhance performance and reduce power consumption by replacing microcontroller-based systems with Raspberry Pi. Advantages of the system include cost reduction, the ability to deliver dynamic and effective advertisements, and providing relevant information to the intended audience at the right time. However, further research is necessary to fully comprehend the technical challenges and implications of deploying this system on a larger scale.

The paper entitled "Design E-Notice Board using Effective Web Technologies for Educational Organizations" proposes a GSM-supported e-notice board system [4]. It utilizes SMS and web technologies to improve the notice delivery processes in educational institutions. The system enables users to send notices remotely via SMS, which are then displayed on LCD displays through a web-based application. This cost-effective and efficient solution has the potential to streamline the notice board system in educational institutions. The paper provides a comprehensive review of the technical aspects of the system, highlighting the benefits and limitations of the proposed solution.

"Smart Notice Board" is another project that proposes a system that utilizes the MQTT protocol with an Arduino to update a notice board through a web-based system [5]. This system aims to simplify the process of updating the notice board by allowing users to log into the system and write messages, which are then sent to the Arduino and displayed on the notice board. The proposed system offers several advantages, such as reducing the time and effort required to update the notice board and enabling real-time updates. However, further research is needed to explore the technical challenges and

implications of implementing this system in larger organizations or institutions."

The paper "Development of Simple and Low Cost Android Based Wireless Notice Board" focuses on the development of an Android-based wireless notice board [6]. This study emphasizes the significance of creating affordable ways to disseminate public information, while also integrating state-of-the-art technology.

In "Electronic Notice Board for Professional College", the authors present the design and implementation of an electronic notice board for a professional college [7]. This study focuses on the integration of technology in public information dissemination, highlighting the importance of using electronic notice boards to improve the efficiency and effectiveness of information dissemination in academic settings.

The paper "Hand Gesture Recognition: A Review" presents a literature review of various techniques and methods for hand gesture recognition in human-computer interaction [8]. The paper discusses the pros and cons of each approach and concludes with an analysis of the most effective methodology.

These studies contribute to the understanding of the application of technology in public information dissemination, including the development and implementation of modern notice boards in academic settings. The findings suggest that modern notice boards have the potential to provide significant benefits in terms of accessibility, interactivity, and ease of use, but also highlight the need for careful consideration of security and privacy concerns.

III. METHODOLOGY

In today's fast-paced world, keeping up with the latest news and information is crucial. Notice boards have been an essential tool for communication in various settings, from schools and workplaces to public spaces. However, traditional notice boards have limitations in terms of displaying dynamic content and providing interactive experiences. To address this, we propose a modern notice board that combines player and interactive modes. The player mode features updates, events, notices, and placement information, as well as daily quotes and specials. The interactive mode of the modern notice board includes all the features of the player mode, such as displaying updates, events, notices, and placements information. In addition, the use of button-based and gesture-based interactions enhances the user experience, making it more engaging and intuitive.

A. System Hardware

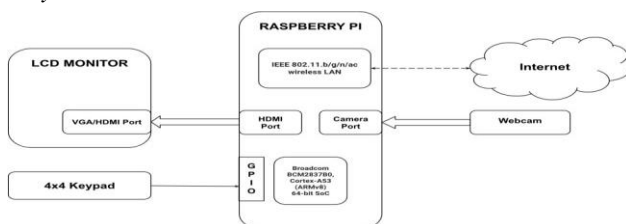


Fig. 1: Block Diagram

The system hardware used in the project includes a Raspberry Pi, which is a credit-card-sized computer that runs on the Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC. The Raspberry Pi is connected to the internet using IEEE 802.11.b/g/n/ac wireless LAN. The system is designed to display information on an LCD monitor, which is connected to the Raspberry Pi through HDMI port.

For monitors with VGA ports, a HDMI to VGA converter cable is required to connect to the Raspberry Pi. In addition to displaying information, the system also allows for user interaction through the use of a webcam and 4x4 keypad. The webcam is used for gesture-based interaction, while the keypad is used for button-based interaction. Overall, the system hardware is designed to provide a seamless and user-friendly experience for both displaying and interacting with information.

B. Software Design and Implementation

For the software part of the modern notice board project, Python was chosen as the programming language due to its versatility and ease of use. The software is divided into three main programs: Main GUI, Updater, and Gesture Getter.

The Main GUI is responsible for displaying the content on the notice board. It was developed using PyQt5, a Python wrapper for the Qt GUI framework. The GUI provides an intuitive interface for users to interact with the notice board in both player and interactive modes. PyQt5 features like QTimer and QPainter classes are used to make GUI components much apparent.

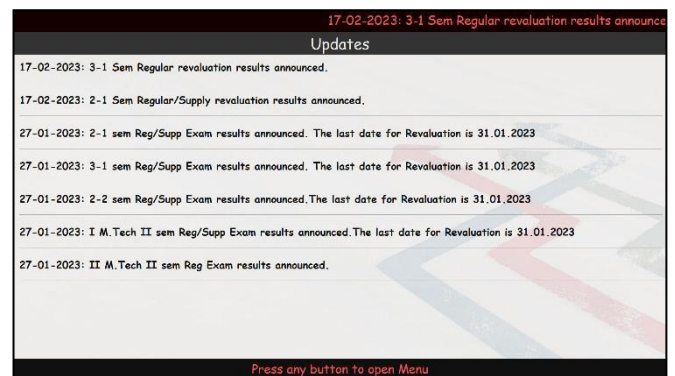


Fig. 2: Updates page GUI

The Updater is a sub-process of the GUI program and is responsible for retrieving data from various RSS feeds and updating the content of the notice board accordingly. Feedparser, a Python library, was used to parse and extract the data from the RSS feeds. Threading was implemented to speed up the updating process and ensure that the GUI remains responsive during data retrieval.

The Gesture Getter is another sub-process of the GUI program and is responsible for capturing gestures made by the user in front of the notice board. OpenCV and cvzone, two popular Python libraries for computer vision and image processing, were used to detect and recognize hand gestures made by the user. The gesture

recognition system allows for easy and intuitive navigation of the interactive mode of the noticeboard.

Finally, the python-vlc module was used to incorporate media content, such as videos and music, into the notice board. The module provides an easy-to-use interface for playing media files.

By combining these various software components, the modern notice board project was able to achieve its goal of providing dynamic and interactive content to users in an intuitive and efficient manner.

C. Interactive Mode of Operation

The user interface of the interactive notice board is intuitive and user-friendly, making it accessible to all users, regardless of their technical proficiency. When the board enters into interactive mode, the user is presented with a menu of six options to choose from: map, updates, events, notices, placements and about pages. These options are displayed in a clear and concise manner, making it easy for the user to understand what information is available and how to access it.

The menu page in the interactive mode of the notice board is a user-friendly and intuitive interface that allows users to easily navigate and access the information they need. The menu page presents users with a list of options, such as map, updates, events, notices, placements, and about pages, which they can select using the gesture-based or button-based interaction methods.



Fig. 3: Menu page in Interactive Mode

The above six pages were chosen for the interactive notice board based on the common and important information needs of the college community.

Adding gesture recognition-based interactivity for navigation in the interactive notice board greatly enhanced the user experience by providing a hands-free and convenient way of accessing information. Gesture-based interaction is an intuitive and natural way of communicating with technology, allowing users to access the information they need simply by using hand movements.

There are several advantages to incorporating gesture-based interaction into the notice board. First, it is more accessible to individuals with disabilities, such as those who are physically impaired or unable to speak, as they can still navigate the notice board using hand

gestures. Second, it is faster and more efficient, allowing users to access information quickly without the need for manual navigation. Third, it is more hygienic, reducing the risk of spreading germs through physical touch, as users do not need to physically interact with the notice board.

D. Future Scope

There is a significant potential for further development and enhancement of the gesture-enabled interactive modern notice board. One possible future direction is to add speech recognition functionality, enabling users to perform voice searches and interact with the board through voice commands using an AI powered chatbot [9].

Additionally, augmented reality features, mobile app integration, cloud connectivity, and artificial intelligence technologies could further expand the capabilities and usability of the notice board. These areas of future research could lead to the development of a more advanced and sophisticated interactive notice board system that can meet the evolving needs of users in various settings, such as classrooms, offices, and public spaces.

IV. CONCLUSION

In conclusion, the modern notice board project has successfully demonstrated the potential for technology to revolutionize the way we share and access information in public spaces. By combining traditional bulletin boards with technologies such as gesture recognition and Internet of Things, we have created a seamless and interactive platform that offers numerous benefits and applications. The project has highlighted the increasing prevalence of modern notice boards in various settings and their impact on the way we interact with information. With the implementation of gesture-based interaction, users are able to navigate the notice board effortlessly and efficiently, making it an ideal solution for busy college institutions.

The project has also addressed some of the limitations of traditional notice boards and explored new possibilities for modern interactive displays. Gesture recognition technology has proven to be an effective and intuitive way for users to interact with digital content in public spaces. With further development and improvement, gesture recognition could be an important feature in future digital signage and interactive display solutions.

In conclusion, the modern notice board project represents a significant step forward in the field of digital signage and interactive displays. Its innovative combination of technologies, including gesture recognition, has the potential to significantly improve the way we share information and interact with digital content in public spaces. As the field continues to evolve, we can expect to see even more advanced and sophisticated applications in the future, further enhancing the role of modern notice boards in our lives.

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