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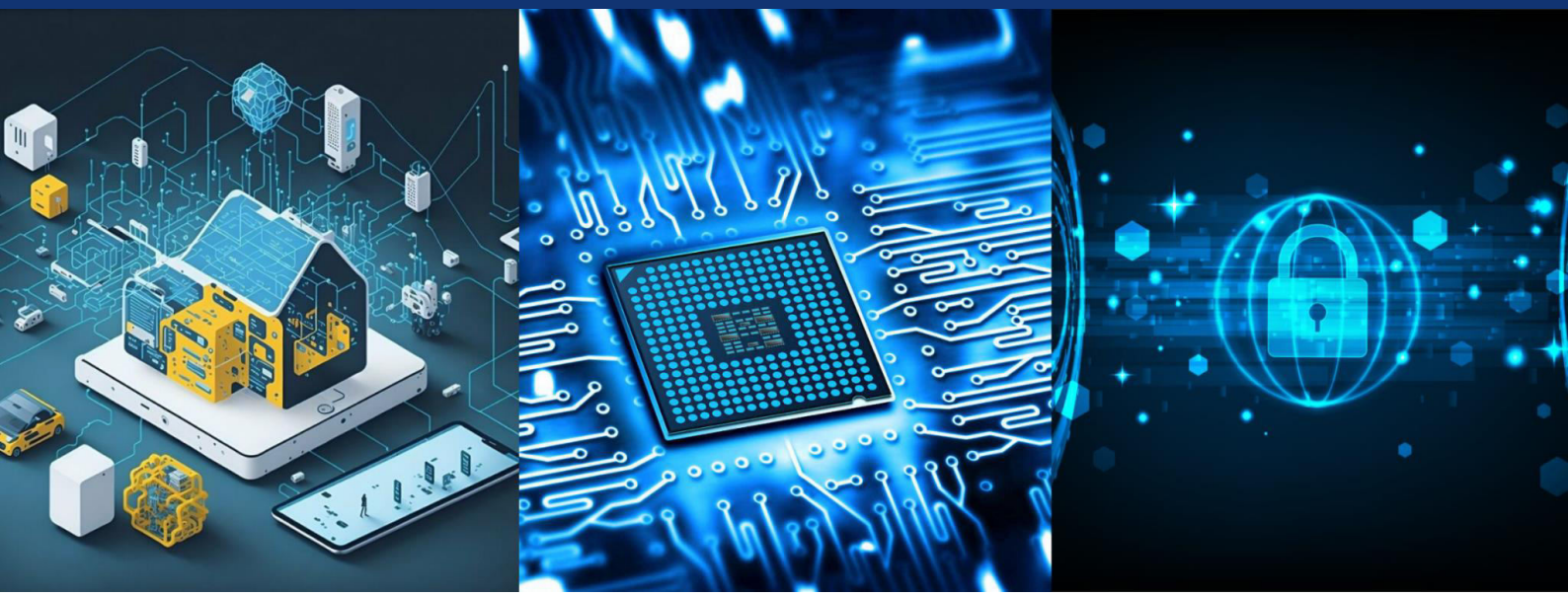

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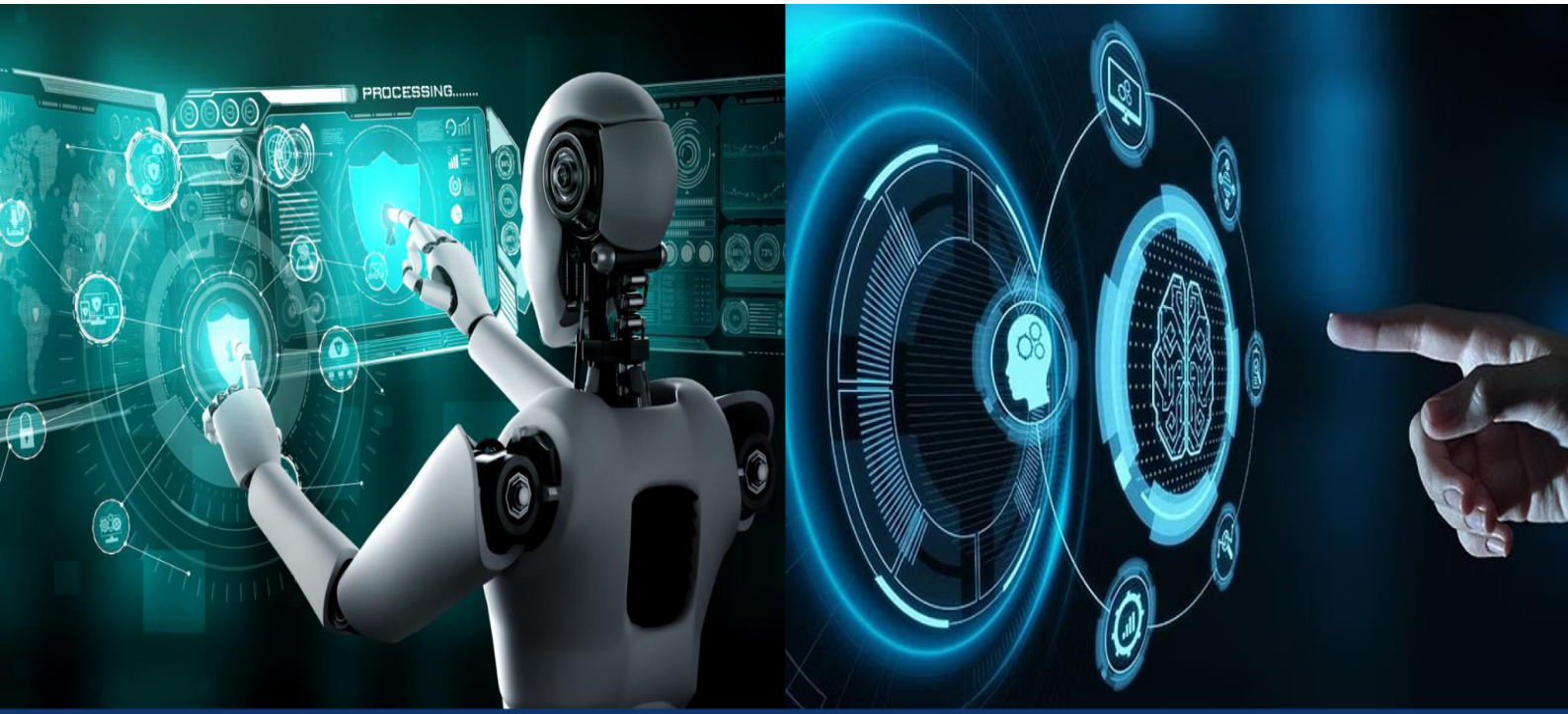

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IoT Based Digital Notice Board using Raspberry Pi

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ABSTRACT: The IoT-Based Digital Notice Board is an advanced system designed to display information in real-time using internet connectivity, replacing traditional paper-based notice boards. This project utilizes the Raspberry Pi 4 Model B as the core processing unit, which is connected to a display screen such as an LED monitor to present notices dynamically. The system operates through a web-based interface developed using Flask, allowing authorized users to upload and manage notices remotely via a secure login. The backend processing is implemented using Python, while the frontend is designed using standard web technologies such as HTML, CSS, and JavaScript. Notices in the form of text, images, or videos can be uploaded from any location and are instantly displayed on the screen through Wi-Fi connectivity. The use of IoT technology ensures efficient communication, reduces manual effort, and enhances the speed of information dissemination in institutions such as colleges, offices, and public places. Additionally, the system supports real-time updates, making it highly reliable and user-friendly. This project demonstrates a cost-effective and scalable solution for digital communication systems, contributing to smart campus and smart environment initiatives

KEYWORDS: IoT, Python, Raspberry Pi 4 Model B, Flask, HTML, CSS, and JavaScript.

I. INTRODUCTION

A Digital Notice Board System is an advanced electronic communication platform designed to display information dynamically using digital screens such as LED TVs or monitors. It replaces traditional notice boards that depend on printed papers, manual updates, and physical presence for accessing information. Digital notice boards provide a modern, efficient, and eco-friendly solution for information dissemination in institutions, organizations, and public places. In conventional notice boards, updating information requires manual effort, printing costs, and physical replacement of notices. This process is time-consuming, less flexible, and prone to delays. In contrast, a digital notice board allows administrators to update content instantly from any location through an internet-based interface. This significantly improves communication efficiency and reduces operational costs. In this project, the Raspberry Pi functions as the core processing unit of the system. It is a compact, low-cost, single-board computer capable of running a full operating system and handling multiple tasks simultaneously. The Raspberry Pi is connected to a display unit (such as an LED TV) via HDMI, where all notices are presented visually. The system is designed with a web-based interface, which allows authorized users (such as administrators or faculty) to upload and manage notices remotely. These notices can be in various formats, including: Text messages Images PDF documents Videos (optional for advanced systems).

Once the data is uploaded, the Raspberry Pi retrieves the content through network communication (Wi-Fi or Ethernet) and displays it on the screen in a structured or slideshow format. This ensures that the displayed information is always up-to-date and easily accessible. The Digital Notice Board system supports real-time updates, meaning any changes made through the web interface are reflected instantly on the display without requiring manual intervention. Additionally, scheduling features can be implemented to display notices at specific times, making the system more intelligent and automated.

II. RELATED WORK

Many researchers have worked on developing digital notice board systems using different technologies. In earlier systems, microcontrollers such as Arduino were used along with LED or LCD displays to show messages. These systems mainly relied on wired communication, which limited flexibility and required physical presence to update the

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content. With the development of wireless communication, GSM-based notice boards were introduced. In these systems, messages were sent using SMS and displayed on the board. Although this reduced manual effort, it had limitations such as network dependency, message delay, and limited message storage capacity. Later, Bluetooth-based systems were developed to allow short-range wireless communication. These systems were simple and cost-effective but were restricted by limited range and connectivity issues. With the advancement of Internet of Things (IoT), modern notice board systems use Wi-Fi technology for communication. Raspberry Pi is widely used in these systems due to its high processing capability and built-in networking features. Web-based applications and cloud platforms are also integrated to enable real-time message updates from anywhere. Recent systems support advanced features such as scrolling text, multi-message display, and remote access through mobile or web applications. Despite these improvements, challenges such as data security, network reliability, and system scalability still exist. Therefore, further enhancements are required to make the system more efficient and secure.

III. METHODOLOGY

The proposed IoT-based digital notice board system using Raspberry Pi is designed to provide an efficient and real-time message display solution. In this system, the Raspberry Pi acts as the central processing unit and is connected to an LCD display. A web-based interface or application is developed to allow users to send messages from a mobile phone or computer. The system uses Wi-Fi for communication, enabling wireless transmission of data. When a user sends a message through the web application, the message is transmitted over the internet and received by the Raspberry Pi. The Raspberry Pi processes the received data and converts it into a suitable format for display. The processed message is then shown on the LCD screen. The system supports continuous operation and allows messages to be updated instantly without any manual intervention. Multiple messages can be displayed, and features such as scrolling text can be implemented to improve readability. The data can also be stored temporarily for future reference or display. The system is designed to be flexible and scalable, allowing additional features or modules to be integrated easily. Overall, this methodology ensures fast, reliable, and user-friendly communication through a digital notice board system.

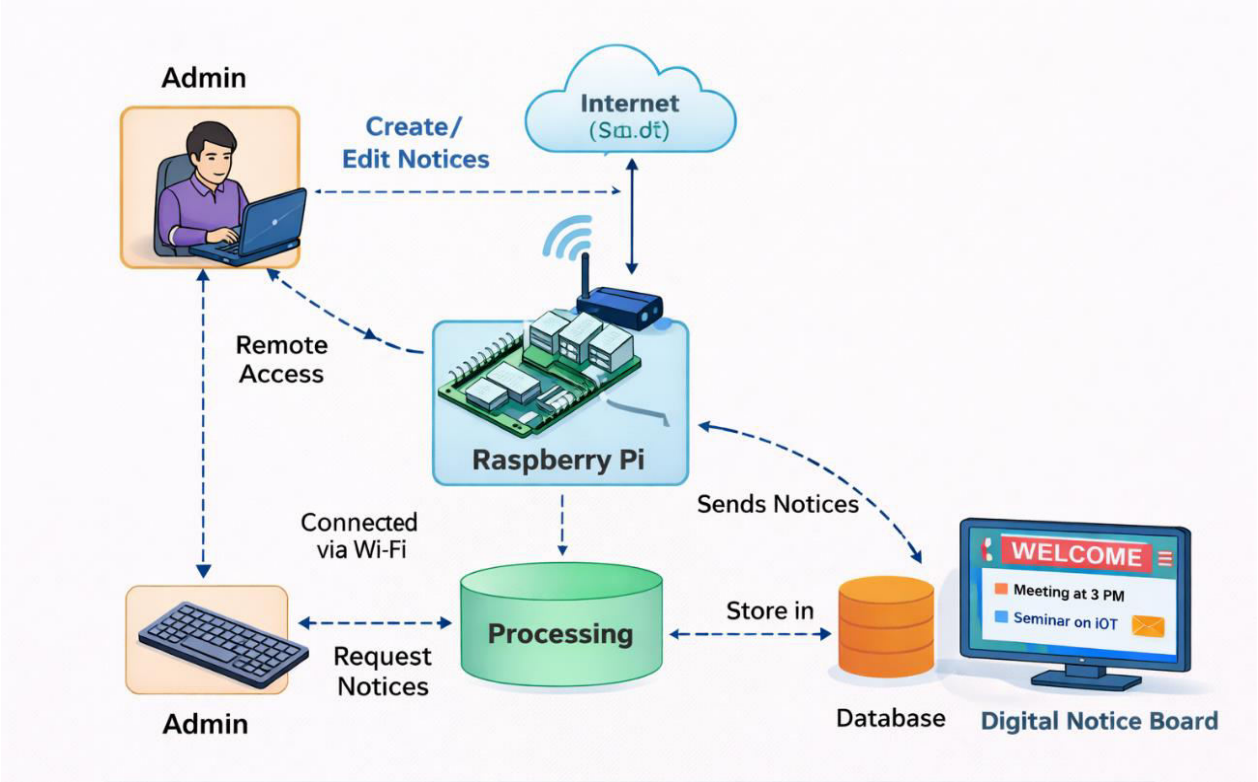

FIG 1: BLOCK DIAGRAM OF IOT-BASED DIGITAL NOTICE BOARD USING THE RASPBERRY PI

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The FIG 1 represents the working architecture of a digital notice board system using a Raspberry Pi as the main controllerIn this setup, an admin creates or edits notices from a computer, either locally or through remote access via the internet. These notices are sent to the Raspberry Pi, which acts as the central controller of the system. The Raspberry Pi processes the incoming requests and stores the information in a database. Once processed, the notices are retrieved and displayed on a digital screen, allowing real-time updates. This system enables wireless communication and remote management, making it easy to update and display information without physically interacting with the notice board.

Additionally, the use of wireless communication makes the system flexible and scalable, allowing multiple admins or multiple display units to be integrated if needed. Security features can also be added to ensure that only authorized users can update the notices. Overall, this setup provides an efficient, cost-effective, and eco-friendly solution for institutions like schools, offices, and public places to manage and broadcast information dynamically and in real time.

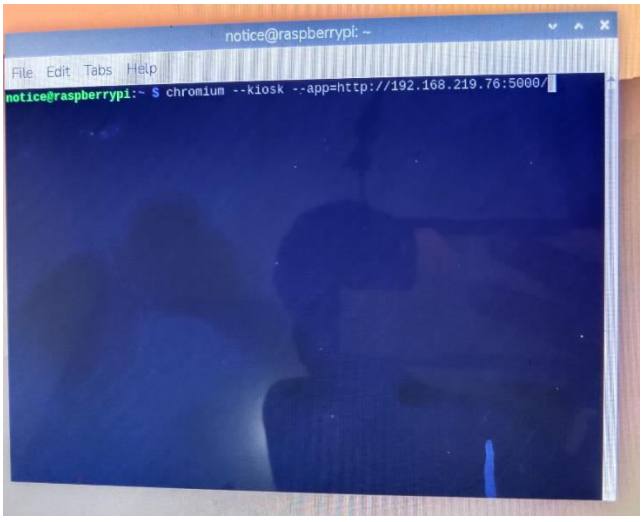
IV. EXPERIMENTAL RESULTS

The Raspberry Pi–based digital notice board system demonstrate that the setup works efficiently for real-time information display and remote management. During testing, notices created by the administrator were successfully transmitted over the internet and displayed on the digital screen with minimal delay, typically within a few seconds. The system showed stable performance when connected via Wi-Fi, maintaining consistent communication between the admin interface, Raspberry Pi, processing unit, and database.

The response time was observed to be fast, even when multiple updates were sent consecutively, indicating that the system can handle moderate traffic without significant lag. Data storage in the database was reliable, with all notices being correctly saved and retrieved without loss. The display unit updated dynamically without requiring manual refresh, confirming the effectiveness of automation. Additionally, remote access functionality was tested from different locations, proving that the system is flexible and accessible from anywhere with an internet connection.

Fig 2:

A) Display



b.) Rasp Berry PI interface

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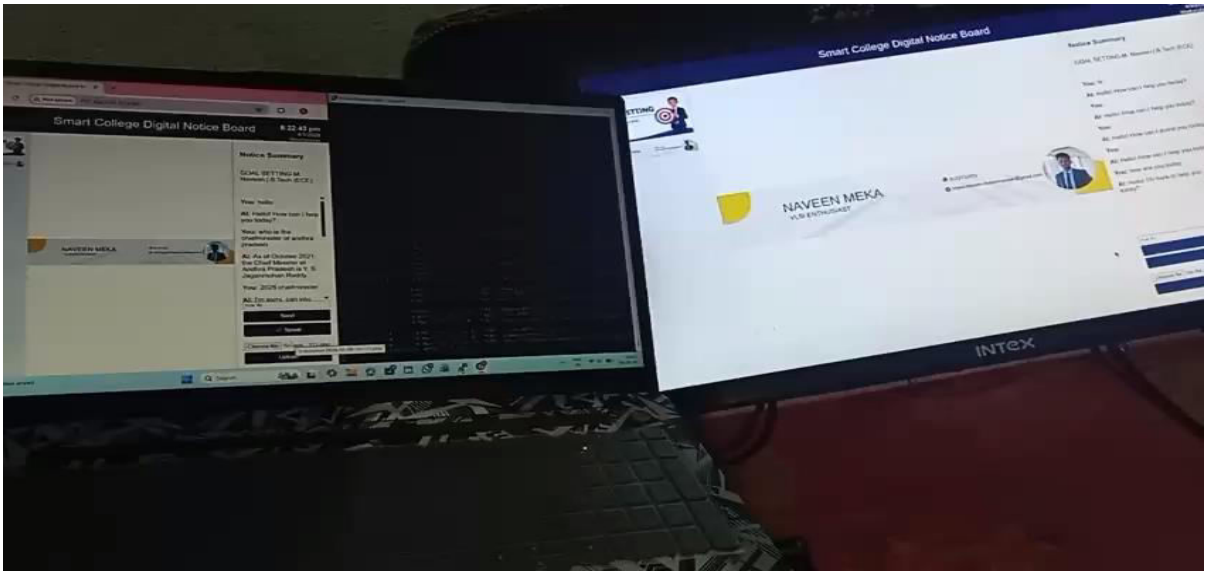
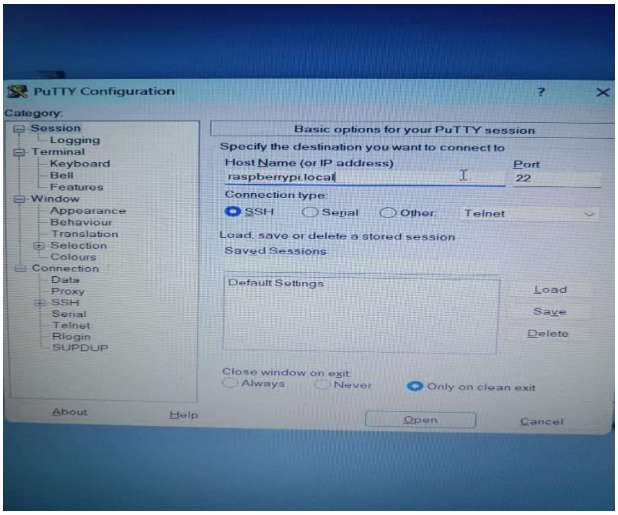
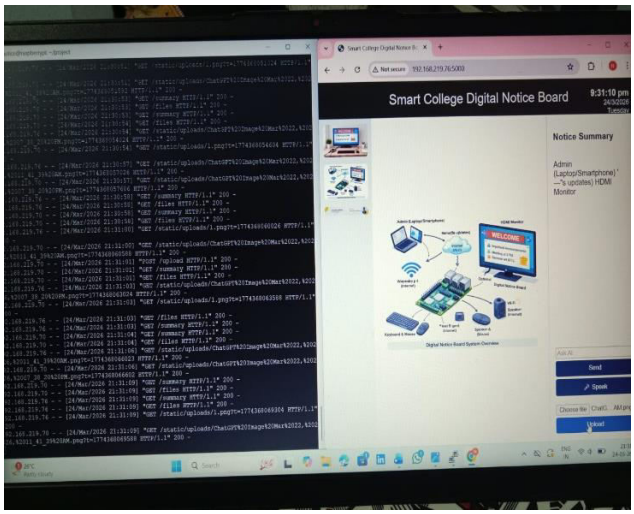


C) Display Notice Board





d.) Configuration Settings e.) Prompt Output

Fig 2 shows the results of IoT Based weather monitoring station using raspberry pi (a) Display, (b) Rasp Berry PI Interface, (c) Display notice Board, (d) Configuration Settings, (e) Prompt Output.

V. CONCLUSION

The IoT Based Digital Notice Board using Raspberry Pi developed in this project provides an efficient, reliable, and modern solution for communication in institutions and organizations. Traditional notice boards, which rely heavily on manual work and paper-based communication, have several limitations such as delayed updates, difficulty in management, and environmental impact due to excessive paper usage. This project successfully overcomes those limitations by introducing a digital, automated, and real-time notice display system. The system integrates both hardware and software components effectively. The Raspberry Pi acts as the central processing unit, handling the execution of the web server, managing file storage, and controlling the display output. The use of the Flask web framework enables the creation of a lightweight and user-friendly interface through which administrators can upload

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notices easily. The system supports multiple file formats such as text, images, and PDF documents, making it versatile and practical for real-world applications.

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