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E-Notice Board using Raspberry Pi

Sanket Parande[1], Namrata Patole[2], Saniya Nadaf [3], Aditi Gujarathi[4]

Department of E&TC, SKNCOE, SPPU, Pune

[1]sanket9284parande@gmail.com, [2]namrata.nikam_skncoe@sinhgad.edu, [3]saniyanadaf.skncoe.entc@gmail.com,

[4]aditirg28@gmail.com

Abstract— **Nowadays Digital communications through electronic devices have become necessary to achieve a green environment, it is exceptionally better and preferred than traditional media like printing papers. Notice board plays a very important role in organizations as well as in broadcasting media, communication with people, the press, and information media. Notice boards consume lots of papers and objects to deliver the notices to schools, colleges companies, etc. Along with paper more time and manpower are required to display notices conventionally. In this prototype, only an authorized user has access to the whole notice board and its functions in a specified area i.e., local area network, hence declaring itself as a top-notch secured system. The E-notice board uses Raspberry Pi as a processor equipped with a portable LCD screen to display notices, achievements, etc, via a LAN server. The authorized user having valid credentials can access or update the content to be displayed. The Python script has been used to allow display on LCD screens. The content will be displayed on the screen for a specified amount of time interval which has been set by the authorized user and can be changed only by admin. Along with images, videos can also be displayed and multiple images can be uploaded and displayed having an equal amount of time intervals between two slides representing the slideshow.**

Keywords— **E-Notice Board, IOT, Raspberry Pi, LAN server.**

I. INTRODUCTION

In any organization, the notice board plays a necessary role in conveying the information to its people. The traditional approach to showing notices is time as well as paper-consuming. For our E-Notice board, we use hardware that includes an LCD screen to display the notice which can be controlled and updated by an authorized user who has login credentials. We use LAN (local area network) server for communication between the admin and the processor for updating and sending the notice.

The E-notice board is carried out using Raspberry Pi and a local area network (i.e. LAN server) along with input and output devices to display important notices, achievements, etc.

II. LITERATURE SURVEY

"Development of simple and low-cost Android based wireless notice board", Published in:5th International Conference on Reliability, Infocom Technologies and Optimization, IEEE,2018 by Neeraj Khera; Divya Shukla; Shambhavi Awasthi.

In this paper, the development of a simple and low-cost Android-based wireless notice board is presented. The proposed system uses either Bluetooth or Wi-Fi-based wireless serial data communication. For this purpose, Android-based application programs for Bluetooth and Wi-Fi communication between Android-based personal digital assistant devices and remote wireless display boards are used. At the receiver end, a low-cost microcontroller board (Arduino Uno) is programmed to receive and display messages in any of the above communication modes.

Software used: Arduino IDE, Embedded C programming language.

"Electronic notice board with multiple output display", Published in: PES Institute of Technology, Bangalore. India. International Conference on SCOPES, IEEE,2018, by Kruthika Simha, Shreya, Chethan Kumar,C Parinitha, Shashidhar Tantry.

The paper aims at iterating the results of a project focused on developing a wireless electronic notice board, which offers the flexibility to control information display within a given range on multiple displays. The notice board will display information being transmitted to it from a central controlling unit, using a serial communication protocol. Arduino UNO, MAX 232 , RS485 communication protocol, and GSM module are used in this model

"Pushing the Digital Notice Board toward Ubiquitous Based on the Concept of the Internet of Everything", Published in: Twelfth International Conference on Ubi-Media Computing (Ubi-Media), IEEE,2019 by Peng-Wen Chen; Yung-Hui Chen; Yi-Hsien Wu.

This paper proposes an interactive message exchange architecture based on the Message Queuing Telemetry Transport (MQTT) protocol that deeply involves users in the IoT process. In this design, users can post notices from handheld devices to any supported display device or social media through a topic naming mechanism based on a subscribe/publish (sub/pub) model. Users can decide which notice to address. This paper also provides a demonstration of an integrated system for a smart campus.

"Smart Info-Board System Based on Voice Recognition", Published in: International Conference on System, Computation, Automation and Networking (ICSCAN), IEEE,2020 by Swathi S., Praveen Kumar P.
In this paper web of Things (IOT) innovation is utilized that delivers the strategy to conjointly data in any type such as content, pdf, pictures, word, and so forth, on the information board. PC is utilized for causing data and Raspberry pi is associated with web on the getting feature. This info- board will likewise show the data by simply questioning its document name through the voice of the approved individual.

"Wireless digital notice board", Published in: International Research Journal of Engineering and Technology (IRJET), Mar 2020 by Mrs. N. Sri Lakshmi, P.L.S.S.S. Roshini, Y. Siva Reshma, P. Saiteja, Y. Chakradhar.
The system uses a Wi-Fi module for communication purpose, connected to Arduino Board and a LED screen display. The system consists of a simple buzzer so as to get notification of new notice as an alert signal. All the programming related to the system had been done using embedded language. The Notice board also sends an acceptance to the user by displaying the current existing notice in webpage.

"IoT based wireless notice board using Raspberry Pi", Published in: Journal of Physics: Conference Series, International Conference on Recent Trends in Computing (ICRTCE-2021) 20-22 May 2021 by Nami Susan Kurian, R K Hemanth Kumar, M Abinaya Shree and S Esakkiammal.
In this paper The LED display is to display the text/voice that the user has sent and the speaker is to announce the received text message. This work is primarily aimed at developing a wireless information board for displaying and broadcasting the announcements and notices that the user sends from the Internet using the IOT technology. By providing a sufficient power supply, the Raspberry Pi, node MCU and LED display work properly and the display is controlled by the android application.

"Design of Smart Mirror as a College Notice Board using IoT.", Published in: Institute of Technology & Science, Hyderabad, India. 2022 IJRTI | Volume 7, Issue 7 by Y.V.Sneha Prabha, Asha Namdhari, Snigdha Pannir Naryanamma.
A smart mirror is a device that functions both as a reflective mirror and a computer display. It is designed with the help of Raspberry Pi v4 as its primary controller. Mirror API is used as notice board. This paper focuses on using raspberry pi modules which are fairly common to run personal and specific tasks as well as leveraging our use of Python, personal security with databases, local servers, and JavaScript to create a fluid simple system for people to use.

III. HARDWARE CONNECTIONS

The main components of this Smart Notice Board are the following:

A. RASPBERRY PI

The Raspberry Pi 3 is equipped with a quad-core 64-bit Broadcom BCM2837 ARM Cortex-A53 SoC processor running at 1.2 GHz, making it about 50% more powerful than the Pi 2. Which means the new Raspberry Pi 3 can be used for office applications and web browsing.
The great innovation in this third version is undoubtedly the addition of a Wi-Fi chip and Bluetooth Low Energy. This not only saves space (you no longer need to connect Wi-Fi and Bluetooth dongles), but also frees up more USB ports for connecting other devices.
By adding these two features, Raspberry Pi has made it clear that this new version is geared to the Internet of Things (IoT) and home automation. The Raspberry Pi 3 is also compatible with Windows 10 IoT Core, an operating system designed for creating and developing applications destined for home automation, robotics and connected objects.

B. LCD DISPLAY

LCD screens are an array of small segments called pixels, which can be manipulated for information displaying. Such displays have several layers, where two panels, made of glass material free of sodium and called substrate, play a crucial role. The substrate contains a thin layer of liquid crystals between them. The panels have flutes that direct the crystals, giving them a distinctive orientation. Flutes are parallel on each panel but are perpendicular between the two of them. We have used LCD to visualize output of the different modules interfaced with Raspberry pi.LAN plays an important role for transferring data.

The main purpose of the system is to display notices in the form of image, text, pdf. using wireless communication and IOT technology Raspberry Pi HDMI Port was connected to a keyboard and a mouse to operate the Raspbian OS software on the LCD.LCD screen was connected to the video outputs via HDMI cable and a connector.
Power supply was given to the processor by connecting it to the CPU or a laptop.
Before connecting all the connections, we insert MicroSD card for data storage, in which our desired algorithm is written.
After completing the connections, we supplied it with power so that our Raspbian OS could be seen on the LCD Display.

In the proposed system, the data to be displayed is controlled and updated from specified area by the authorized system a website is provided to the admin where only he/she has the access to the username and password to which he/she can login to write and display the notice on the LCD screen or the notice board via Local Area Network and Wifi. . The request is sent to the Raspberry Pi via LAN/IP server.

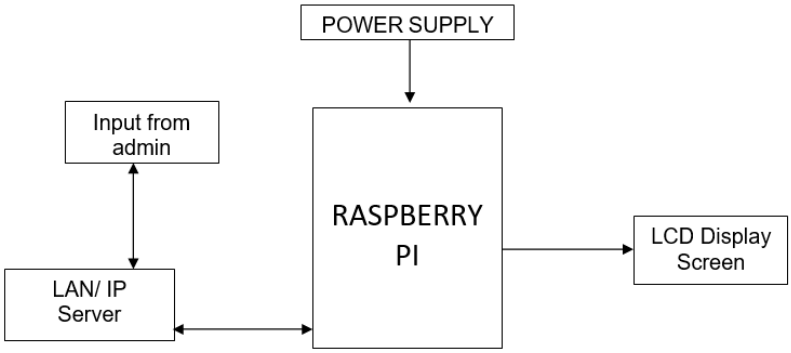

Fig.1 Block Diagram of E-Notice Board

Fig. 2 Hardware connections with Raspberry PI 3B+

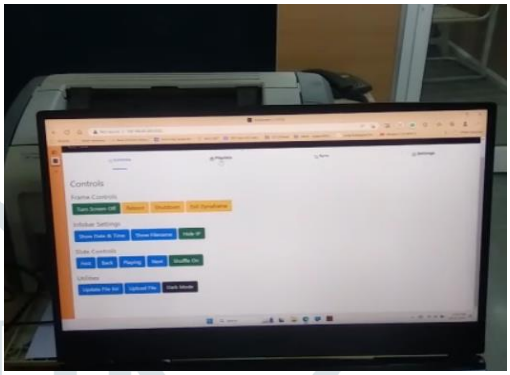

Fig.3 Website for E-Notice Board

IV. METHODOLOGIES

A. ARCHITECTURE

The system is divided into two parts: the admin side and the Client side. The admin side consists of the webpage through which only the authorized person can control the notices to be displayed on the board. On the client-side Python script is executed on the Raspberry-pi computer that will be interfaced to the admin login page. We have downloaded Dynaframe which is a Python script library used for virtual display. Once, the notice is uploaded from the login page, it will be displayed on the board for a specified period of time.

B. SOFTWARE IMPLEMENTATION

1. Admin-side (Login webpage)

On the admin side, HTML and CSS are used to design a webpage for uploading the notices. Only a person having valid login credentials will be able to access the page. If anyone tries to log in with invalid credentials an error will occur and the person will not be directed to the next page.

2. Client-side (Raspberry Pi working)

After flashing and inserting the SD card on the raspberry pi, OS known as Raspbian is installed and we run a Python script called Dynaframe on the Pi. The script is a dynamic photo and video slideshow system used for displaying our notices. The script runs through the folder of pictures where our documents will be saved.

3. Server-Client Interfacing.

We have to interface the server and client by placing our HTML and CSS file which is nothing but our login page into the folder present in the dynaframe script. This way whenever we upload our notice on the login page, it will be uploaded in the script and displayed on the screen for a specified period of time.

C. ALGORITHM:

Step 1: Start
Step 2: Open the login page and enter valid credentials.
Step 3: If the credentials are valid then you are directed to the next page. If no then repeat step 2.
Step 4: Upload the notice from the admin page.
Step 5: The notice will be stored in the script folder.
Step 6: Uploaded notice that has been set will be displayed
Step 7: End.

V. RESULTS

The E-notice board displays the notices on the screen uploaded from the admin side. The Python script is executed on the Raspberry Pi OS and is used for displaying the photos and videos too. The time interval is set by the admin on the admin page and for that specified period of time, the notice is displayed. The admin page is interfaced with the Python script by placing it in the same folder where Python code has been saved. The output slides shown below consist of different steps involved while implementation. First, some trial pictures were uploaded, and then after debugging all the errors final timetable of our college was uploaded and displayed successfully.

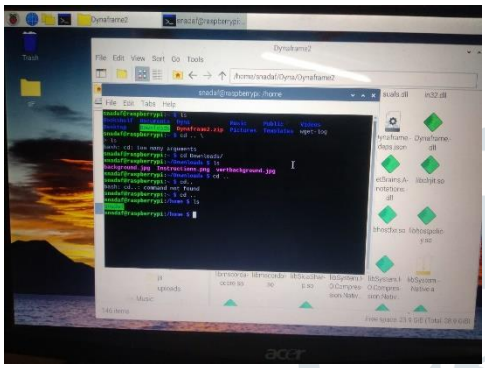

Fig.5 Python script execution on the terminal

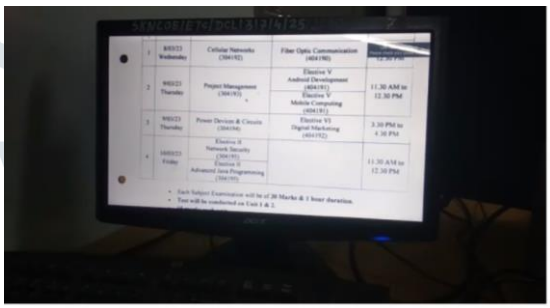

Fig.6 Final Output screen (Time table has been displayed)

VI. APPLICATIONS

- E-Notice board provides improved security due to username and password authentication system and the proposed system is eco-friendly due to reduced usage of paper.
- As raspberry pi acts as a central processing unit, we can send not only text messages but also can send image files in the form of jpg/jpeg, png, and pdf files of better quality.
- This type of notice board can be used in colleges and schools to circulate notices, daily event schedules, circulars, and other information throughout different departments. This system mainly focuses the small organizations having limited resources but it can be implemented commercially in small to big organizations with slight changes in hardware specifications.

VII. CONCLUSIONS

This project gives an effective method for showing messages on Notice Boards utilizing Wireless Technology. The proposed system deals with the design of a smart and efficient notice board that accepts messages from the authenticated user, stores it, and displays it on screen. It is an eco-friendly design that uses less manpower to display important information. This system has many commercial applications and can be used in banks, schools, railway stations, etc and has future scope for further development and can be modified according to its application.

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We want to specially thank our respected internal guide Prof. S. M. Ingawale for her guidance and encouragement which has helped us to achieve our goal. Her valuable advice helped us to complete our project successfully. Our Head of Department Dr.S.K. Jagtap has also been very helpful and we appreciate the support she provided us. We would like to convey our gratitude to Principal, Dr. A. V. Deshpande and all the teaching and non-teaching staff members of E&TC Engineering Department, our friends and families for their valuable suggestions and support.

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