

Digi Board – for campus alerts using Raspberry Pi

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Abstract – In this paper, we propose an advanced and wireless notice board called as Digi Board. Digi Board is wireless digital notice board built around arm controller Raspberry Pi for displaying notifications, important updates and campus alerts for campus such as University or College. It is a combination of hardware and software. Notices or updates are posted using Android app or web portal. The device through which notice will be posted and also the receiver will be connected to same wireless network of the respective campus. Raspberry Pi will act as receiver and will receive the notices through the same wireless network. These notices will be displayed on LED/LCD screen. Each LED/LCD screen will be connected to Raspberry Pi and for posting notice, user or admin will have to address the Raspberry Pi connected to required LED/LCD screen. The main aim of this proposed project is to drastically reduce the cost involved, consume smaller amount of power and help in achieving quality of service with reduced efforts. This project also allows user / admin to post images.

Key Words: Raspberry Pi, Android, Web portal, LED/LCD.

1. INTRODUCTION

Notice boards are used to display public notices. Notice Board is primary thing in any institution or public utility places like colleges, bus stations, etc. But nowadays, most of the notices are in printed format. Thus, person has to type the notice or prepare the notice, take a print of it and then stick it to notice board. It is a lengthy process. To overcome this, we came up with the idea of Digi - Board. The Digi Board is a digital notice board used to display public notices. It is built around ARM controller Raspberry Pi. Notices are displayed on LCD/LED screen. This is achieved using our Android app or web portal. Digi – Board is advanced wireless notice board where admin can post notices and important updates about various events and programs, quotes, thought for the day, etc. There is a provision by which admin can post notice in form of images. Multiple image formats including jpeg, png, etc. are supported. The main aim of this project is to save both time and energy of user/ admin. Also, by using Digi-Board, paper will be saved as notices will be displayed digitally.

2. LITERATURE SURVEY

2.1 Existing System

The notice boards are mostly manual. The person who wants to post a notice will have to write down a notice or take a print of the notice. This makes use of paper and also requires more time as well as human effort. Paper is made of trees. Thus, more trees are cut to make paper. This leads to negative impact on ecosystem and environment. There are also electronic notice boards which use dot matrix display for displaying notices [2]. The problem with dot matrix display is that, not many notices can be displayed at a time and notices will be displayed after long time when they are posted. Also, the systems that are already in existence use GSM module or are required to connect to external Wi-Fi module for posting notices [1]. GSM stands for Global System for Mobile and Wi-Fi stands for Wireless Fidelity. The biggest drawback GSM based systems that, additional hardware such as GSM module is required and is not reliable. Also, the displayed notices cannot have images.

2.1 Proposed System

In the proposed system, notices will be posted using Wi-Fi. User or Admin will be able to post notice digitally using Digi – Board. Notice can be in form of text or image. This can be done through our web page and also Digi – Board Android app. The user posting notice can also edit notice as well as delete the posted notice. The communication between server and client is obtained using wireless connection. It is not practically possible to carry desktop PC or laptop everywhere, every time. But, nowadays most of the people are having smart phones, which they can carry anywhere and anytime. The proposed system allows user/admin to post notice from browser using our web page as well as android phone using android app. Not always notices are in form of text. Some important notices or updates can be in image form also. Proposed system also provides provision for uploading images which can be displayed on LCD/LED screen (e.g. class time table/ university time table) multiple image formats including jpeg, png, etc. are supported. The proposed system also syncs within seconds and is built with simple language which is better for error solving. The proposed system is built around Raspberry Pi 3 model B which has inbuilt Wi-Fi module. Thus, no external Wi-Fi module has to be connected. Also. The proposed system will be having user friendly GUI

thus, making Digi-Board web page as well as Android app easy to use.

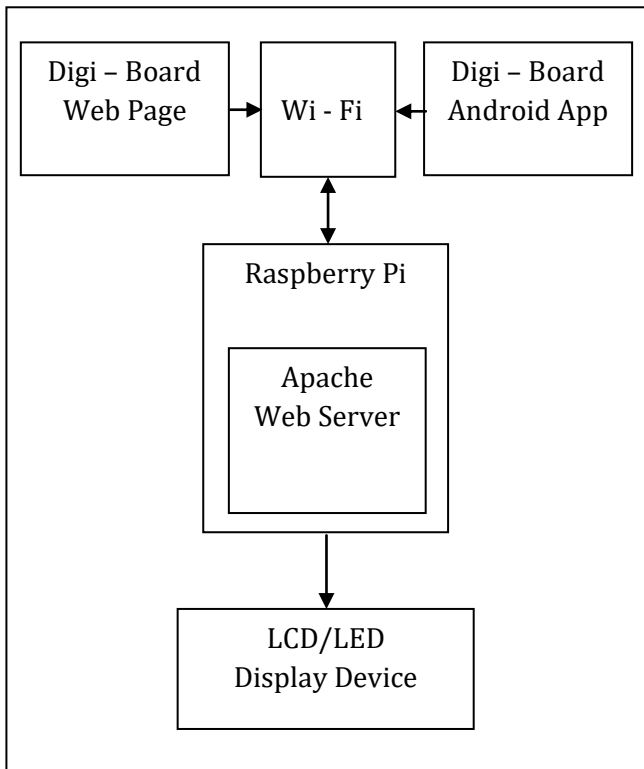


Fig -1: Block Diagram of Proposed System

3. SYSTEM REQUIREMENTS

3.1 Hardware Requirements

- A. Raspberry Pi 3 MODEL B (ARM Cortex-A53, 1.2GHz)
- B. Power Supply
- C. Micro SD Card (At least 16GB) – a micro SD Card is used to store OS and other important files
- D. LCD/LED screen.
- E. HDMI cable – to interface Raspberry Pi with LCD.
- F. Android based Smart Phone
- G. Wi – Fi Router

3.1.1 Raspberry Pi

The Raspberry Pi 3 Model B is the latest version of the Raspberry Pi. It is a tiny credit card size computer It has ARM quad core Broadcom A53 Cortex 64-bit 1.2 GHz processor with 1 GB RAM. It has 4 x 2.0 USB ports. Thus, keyboard and mouse can be connected to it. It can also be connected to TV. Raspberry Pi 3 has inbuilt Wi-Fi and Bluetooth module. It has one HDMI port, ethernet slot,



Fig -2: Raspberry Pi

40 pin extended GPIO for universal projects, CSI camera port and 3.5mm audio jack. It also has a slot for inserting microSD card.

3.1.2 Power Supply

Raspberry Pi requires a 5.1V 2.5A AC-DC adaptor - to power Raspberry Pi which is connected through micro USB

3.1.3 Memory Card

A microSD card of minimum 16 GB is required to store OS and other important files

3.1.4 LCD/LED Display

Latest generation and high definition display devices such as LCD or LED screen is required to display notice.

3.1.5 HDMI Cable

Raspberry Pi is connected to LCD/LED monitor using HDMI cable for high resolution.

3.1.6 Android Smart Phone

An Android smart phone (versions above Android 4 Ice Cream Sandwich) for posting notice.

3.1.7 Wi – Fi Router

Wi – Fi router will be required to cover larger area where devices are to be connected wirelessly.

3.2 Software Requirements

- A. Languages: PHP, HTML5, CSS3, JavaScript, jQuery.
- B. Apache web-based server
- C. Android Studio IDE
- D. Web Browser.

3.2.1 Languages Used

Advanced techniques such as HTML5, CSS3, JavaScript, jQuery, PHP5 will be used for development of our web page.

3.2.2 Apache Web Server

Apache HTTP server 2.4.29 is the latest release of Apache HTTP server, which is commonly known as Apache web server.

3.2.3 Android Studio

Android Studio is the official IDE of Android app development. The latest release of Android Studio is Android Studio 3.0

3.2.4 Web Browsers

Digi-Board is optimized for most modern web browsers, including Google Chrome, Internet Explorer (version 7 or newer) and Mozilla Firefox.

4. WORKING

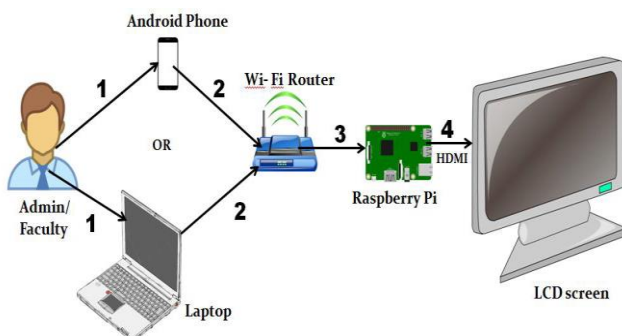


Fig -3: Diagrammatic of Working of our System

The above figure is working of Digi - Board system. User or admin can use android phone or web browser to post notice. The android phone or laptop or computer is connected to college Wi-Fi. Notice can be posted using Digi - Board android app as well as through Digi - Board web page. Android app is developed using Android Studio 3.0 and web page is developed using advanced technologies such as HTML5, CSS3, PHP 7.1, jQuery 3.2.1. Raspberry Pi 3 has inbuilt Wi-Fi module which makes it better than Raspberry Pi 2. Apache HTTP 2.4.29 server is installed on Raspberry Pi 3. This server is connected to college Wi-Fi using Wi-Fi module of Raspberry Pi. Thus, client i.e. android phone or laptop and server (Raspberry Pi) are connected to same Wi-Fi. Raspberry Pi will be connected to LCD/LED screen with HDMI. There may be more than one LCD/LED screens in Digi - Board system. Each LCD/LED screen will be connected with one Raspberry Pi. Thus, every LCD/LED screen will be connected to one Raspberry Pi which will be connected to

wireless network. Each Raspberry Pi will have a unique static IP address. Client/Admin will have to enter IP address of the Raspberry Pi to which LCD/LED screen the notice is to be posted. The server will receive notice and store it. This file will be accessed using Linux file system. The same will be further sent to LCD/LED screen. Thus, notice will be posted. As client and server are connected to same wireless network, the time taken by Digi - Board system will be negligible making Digi - Board system a real time system.

5. FUTURE SCOPE

Notice boards play an important role not only in colleges and institutions but also, in many more places such as organizations, police stations, co-operative societies, judicial courts, jewellery shops, railway stations, bus stops, hospitals, clinics, hotels, and many more. Notice boards are widely used around us. Thus, replacing manual notice boards with Digi - Boards can help people on large scale. Digi - Boards can be used for displaying trains status on railway stations and also updates and news such as mega blocks, etc. The Digi- Board can also be used in shopping malls for displaying offers, floor maps, etc. Digi - Boards can also be used in commercial shops for displaying prices of various products, etc. Digi - Board can be used for broadcasting displays and controlled remotely. This increases scope of Digi - Board as, it can be used not only for posting notices but also, for advertising purpose.

6. CONCLUSION

The Digi- Board system uses latest generation of high definition screen and projectors to display digitally sourced content such as text and images with real time display. The system is a collaboration of software and hardware through which, it is easy to implement the idea of Digi - Board with less complicity. The Digi - Board can avoid paperwork, reduce human effort usage in definite purpose areas. It is a step towards Digital India.

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BIOGRAPHIES



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