

IoT Based Digital Notice Board using Raspberry PI

Mahantesh.S. Katapur, Eranna hadapada, Mahant.G. Kattimani

Abstract— With the advancement in Digital Technology, it is more efficient to represent the information on digital devices. Now a day's internet is the primary mode of communication everywhere. Digital Notice Board is primary thing and plays a vital role in any institution or public utility places like bus stations, railway stations, colleges, malls, etc. But sticking various notices day to day is a difficult process. In this paper, it has been implemented an IoT (Internet of Things) Based Digital Notice Board using Raspberry pi and Operating System With the help of this project. At any time, we can add or remove or alter the text according to our requirement and authenticated person can convey the message/notice even from remote place on digital devices like LCD display

Index Terms— Android System, Digital Notice Board, Raspberry Pi Card, IoT, Web server

I. INTRODUCTION

In earlier days people used the paper as the medium to convey messages. The paper material, which is made of pulp of the tree, will be scarce in future. It is mandatory to save the trees by employing digital notice board rather than the conventional method. Printing a paper requires the quantitative manpower. This conventional method is very expensive. An alternative to this conventional method is efficient to use the digital media and digital technology. Notice boards play a vital role in conveying the messages to many people at the same time. Notice boards are used in Institutions, Organizations and many public places. In earlier days printed paper is used to display on a notice board. These conventional notice boards are not so interactive for the modifications in the message which is to be conveyed. Also requires huge amount of resources and manpower. A digital notice board can be replaced in place of conventional notice board to make more adaptable and interactive. Here in which reduces the manpower and resources. The Digital notice board uses the digital technology and the electronic components/modules. It is implemented to display the notice or message which is more convenient for the administrator in terms of displaying, modifying and viewing of the notices/messages.

In the paper [1], a smart electronic notice board is implemented using Wi-Fi, in which a wireless transmitter sends a notice using Wi-Fi Protocol. The disadvantage of this system is the information can be passed about 100 meters distance range only. A remote user with more than the specified distance cannot access to this system.

In the paper [2], an Android controlled E-notice board was developed which uses the GSM technology. The disadvantage of this system is, it was developed by using GSM technology and it won't use the IoT. As a result, the system is not more user friendly. In this system the notice which will be displayed is limited to the message length of 160 characters only. Also, the system is more costly.

A survey paper on Android controlled notice board [3] was published by Saloni sahare, Rajat kadwe, which compares the SMS, controlled smart E-notice board and Bluetooth based LED display. In this paper the both the systems which are implemented have the limitation of the message length which is to be displayed.

A wireless digital notice board using GSM technology [4] has been designed by Ramchandra K. Gurav, Rohit Jagtap. In this paper, the implemented system can display the notice from an authorized person and sends it to GSM module of digital notice board. In this design also the message length is limited. Again, the system is not user friendly.

In the paper [5], display message on notice board using GSM technology has been implemented. In this design, when the user sends a Short Message Service, it will be received by the GSM modem of the receiver. This message will be displayed on the LCD module of digital notice board with the help of microcontroller. In this design, the notice text length is limited to a standard SMS length only. Also, the system does not work in case of network failure.

In the paper [6], SMS based wireless notice board with monitoring system has been implemented. The system is designed using ARM-LPC2148 interfaced with Graphical Display. In this implementation multiple displays along with a decoder are used to select a particular display. The information is sent to the corresponding display monitor through an ARM controller by using GSM technology. In this design, all the notices are documented and a record may be maintained for future purpose. In this design, the monitoring system consists of an image sensor to capture the images for the specified duration and those images can be stored in a PC. This system has the limitation of less display size.

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II. BLOCK DIAGRAM

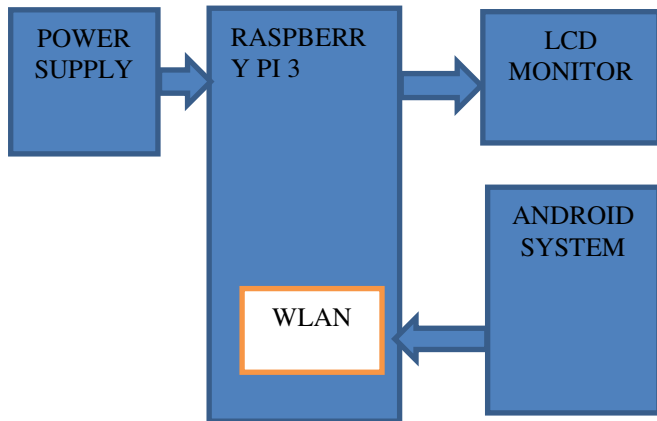


Figure 1- block diagram of IoT Based Digital Notice Board Using Raspberry Pi

It consists of the following modules.

1. Power Supply
2. Raspberry Pi-3
3. HDMI Port
4. LCD Monitor
5. Operating system

A. POWER SUPPLY

The Raspberry Pi 3 requires a +5.1V supply. The exact current rating of Raspberry Pi depends on the Peripherals connected to it. It requires a 2.5A power supply to run the Raspberry Pi.

B. RASPBERRY PI 3

The Raspberry Pi [7] is a type of micro-computer developed in the UK. The original Raspberry Pi and Raspberry Pi-2 are manufactured in several board configurations through licensed manufacturing agreements with Newark element 14, RS Raspberry Pi logo Components and Broadcom BCM2835 SoC has developed the original model of Raspberry Pi, which consist of an ARM1176JZF-S 700MHz processor, Video Core GPU, and with 256MB RAM. The system has Secure Digital or MicroSD sockets for boot media and persistent storage. In 2014, the Raspberry Pi foundation launched the Compute Module, consists a BCM2835 SoC with 512MB RAM and an eMMC flash memory. Also provides Debian and Arch Linux ARM distributions. Tools are available for Python as the main programming language, with support for BBC BASIC, C, C++, Java, Ruby and Perl. In the year 2015, the Raspberry Pi-2 was released. This new computer board has Broadcom BCM2836 System on Chip, with a quadcore ARM Cortex-A7 CPU, Video Core IV dual-core GPU and 1GB RAM. Raspberry Pi-3 Model B ARMv8 with 1GB RAM is used in this project. The Raspberry Pi-3 shown in fig. 2, has two major upgrades [5]. The first is a next generation Quad Core Broadcom BCM2837 SoC 64-bit ARMv8 processor with speed of up to 1.2GHz compared to the previous 900 MHz on the Raspberry Pi-2. The second is the built-in BCM43143 SoC Wi-Fi chip, which supports the wireless operation. The power source has been upgraded to 2.5A, allowing it to power even more heavy load devices using USB ports. It consists of 40-pin GPIO header gives access to 27 GPIO, I2C, UART, SPI, 3.3V and 5V sources.



Figure 2- Raspberry pi 3 Model B

C. HDMI PORT

The Raspberry Pi has a HDMI port which you can plug directly into a monitor or TV with an HDMI cable. This is the easiest solution; some modern monitors and TVs have HDMI ports, and some do not, but there are other options.



Figure 3-HDMI Port

D. LCD MONITOR

We use the monitor as display, LCD is used in a project to visualize the output of application. LCD can also be used in a project to check the output of different modules interfaced with the raspberry pi module. LAN plays a vital role in a project to see an output.



Figure 4- LCD Monitor

E. OPERATING SYSTEM

An operating system (OS) is system software that manages computer hardware, software resources, and provides common services for programs. Time operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources. For hardware functions such as input and output and memory allocation, the operating system acts as an

intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and frequently makes system calls to an OS function or is interrupted by it. Operating systems are found on many devices that contain a computer – from cellular phones and video game consoles.

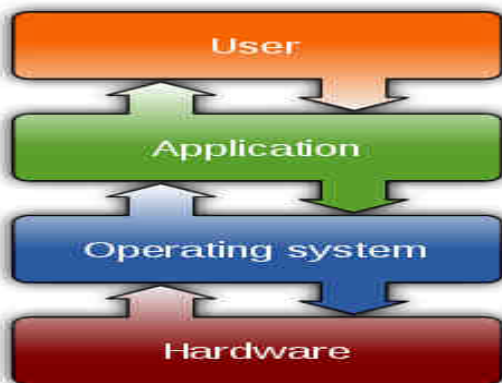


Figure 5- Operating system diagram

III. PROPOSED PLAN OF WORK

This will be a moving message display, which can be used as the digital notice board, and also a Wi-Fi transceiver, which is the latest technology used for communication between the mobile and the embedded devices. System will work like when the user wants to display or update the notice board, which is very useful to display the circulars, daily events, schedules are to be displayed. Then the WI-FI connected ARM cortex to the Display system will receive the LCD in notice board system, the Raspberry Pi chip has been inside the system is programmed in such a way that when the coding is written in embedded system Language receives any message it will read the message form serial port Through WI-FI transceiver, if the message is typing in any personal computer then it will be start displaying the information in the display system. The messages are displayed on the LCD display.

A. ALGORITHM

Following step by step procedure will explain the actual working of the Digital notice board system

1. Start system
2. We should Login to access notice board
3. If the user is valid then go to step 4 otherwise go to step 2
4. We should Select Information in the form of image, pdf and text files
5. Upload files to be displayed
6. Store the message
7. Set the time duration of displayed messages
8. Set maximum limit for the size of image or text to be displayed
9. If the received image or text is less than the limit it will directly displayed. Otherwise image will be resized
10. When pdf is received it will be converted to image
11. Received image and text files
12. Displays stored messages in First in first out order (FIFO)
13. Check for new notice. If it occurs go to step 8 else go to step 9
14. Repeat above steps when power supply maintained
15. Stop system

IV. RESULT AND DISCUSSION

It has been observed that by employing the proposed design, the display notice length is extended upto 2000 characters with LCD monitor. In this design, it is also observed that an authorized user with android mobile and application can update the notice from remote location provided valid internet connection. The system is ensured with high end security using user name and password feature in the operating system.

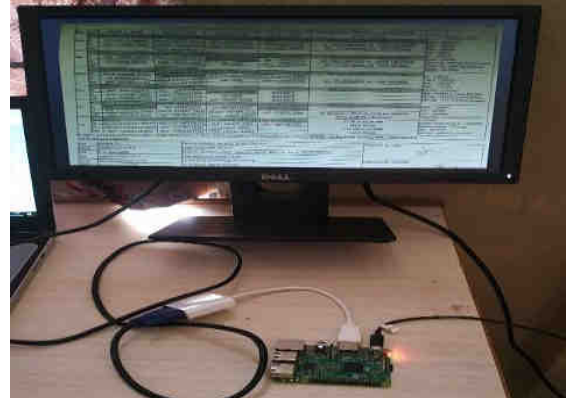


Figure 6- IoT Based Digital Notice Board Using Raspberry Pi
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ADVANTAGES

Following are some of the advantages of IoT Based Digital Notice Board.

- An authorised user can send the message/notice from anywhere.
- This system will reduce the manpower as well as the human work.
- It also saves the resources like time, printer, printing ink and paper.
- It is the most secure, reliable and confidential as the administrator is provided with username and password.
- Apart from the administrator no one else can manipulate/change the notice.

V. CONCLUSION

- A. In the world full of automation, we have to employ new technology in the place of conventional methods.
- B. Wireless operation provides fast transmission over long range communication.
- C. It saves time and resources. From remote location we can send data to display. User authentication is provided.
- D. The proposed system can further be extended to display the notices from longer distances by providing the internet connectivity which will allow the system to update notices anywhere in the world.
- E. Wireless operations permit services, such as long-range communications, that are impossible or impractical to implement with the use of wires. It provides fast transfer of information and are cheaper to install and maintain. This paper provides an efficient way of displaying messages on Notice Board using Wireless Technology. It also provides user authentication in order to avoid any misuse of proposed system.

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