

SMARTBOARD USING RASPBERRY PI

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ABSTRACT

From the past many years we are seeing the notices of the college companies offices is usually displayed on the normal board having number of notices written on the same board. As notice board is the somewhat the ancient concept of displaying notices we should think of some more innovative idea to create a new board rather a smart board. So we come to the conclusion to design a smart board such that it can fulfill the requirements such as less manual operation, same notice/lecture can be displayed at the various places at the same time, the notice (board display) should be visible from maximum area or distance, compact and compatible, easy handling. By using raspberry pi I am developing a smart board in which a person will deliver a lecture sitting in his/her comfortable place and the lecture is being delivered to the students/candidates wherever they want. At the same time the lecture is been recorded for further use. For this purpose we are using the IP protocols/addresses to handle the whole concept. Delivering lecture is one example; the use of smart board can be done in many other different ways .We use the wireless fidelity source to run this concept.

KEYWORDS: Raspberry Pi, Wireless Fidelity Connection, LAN, Raspbian OS

INTRODUCTION

Before many years we are seeing the notices of the college, companies, offices is usually displayed on the normal board having number of notices written on the same board .So I am thinking that if all these notices are displayed at the same place one by one except occupying the whole board area. So I came to the conclusion to make a notice board such that it can make up to the requirements such as less manual operation, same notice can be displayed at the various places at the same time, the notice should be visible from maximum area or distance.

By using raspberry pi I am going to develop the smart board which will save the written data by person on paper in computer and project that data at the same time with the help of projector.

Even the data written on paper will be saved in computer in video format by using camera. And the data will be displayed in school or institute by using zigbee protocol.

In this world everyone needs a comfort living life. Man has researched different technology for his sake of life. In today's world of very easy possibility of connecting people are becoming easy access to information.

Whether it's through the internet or television, everyone want to be aware with the latest events happening around the world. Now a day's people prefer wireless connection because they can interact easily with people and it require less time. The vital part of the paper is to develop a wireless notice board that display message sent from the user and to design a simple, user friendly system, which can have message and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time the user uses the system.

GSM and wireless fidelity are the wireless technology use.

A. HARDWARE

Raspberry Pi

The **Raspberry pi** is a mini computer which is designed in a single board with all the required components required for running an operating system. The board has a micro USB port which uses supply 5V DC. The board can be powered up from the USB port. The provides HDMI port which is used to connect it to the high defination television using an HDMI cable. A video input port is also provided with a Raspberry pi board which is used to connect an external camera. The board can also be connected to the PC using a HDMI to VGA converter. The board contains two USB ports from which one is used to keyboard and other to mouse. There is a local area network to connect a computer network. The board also has a SD card slot. The device using Broadcom controller chip which is an (System on Chip). This controller has all the peripherals like timers, interrupt controller, GPIO, USB, PCM / I2S, DMA controller, I2C master, I2C / SPI slave, SPI0, SPI1, SPI2, PWM, UART0 and UART1. This SOC has the powerful ARM11 processor which runs on 700 MHz at its core. The controller also has a graphical processing unit (GPU) which includes Video Core, MPEG-2 and MPEG-4. It also has a 512 MB SDRAM. The operating systems versions of Windows, Mac and Linux are available which can be installed in the Raspberry pi board.



Figure 1: Raspberry Pi Connection with Different Component

Source-Destination Communication Using Wi-Fi

In this project, source -destination communication is explored by transferring file wirelessly to the server using Wi- Fi communication. Raspberry Pi supports wireless communication by allowing connection to wireless adapter. Even LAN connection is given to the Raspberry pi to work upon the further process.

Hardware List

- Raspberry Pi B+: Small and portable board that can perform as a computer. It acts as a server in this project.
- SD card: Raspbian OS in SD card
- Wireless adapter of IB all baton.

B. SOFTWARE

IP Address

An **Internet Protocol address (IP address)** is a numerical label assigned to every device participating in a computer network that uses the Internet Protocol for communication. An IP address serves two functions: host or network. The design of the Internet Protocol defines an IP address as a 32-bit number and this system is known as **Internet Protocol Version 4 (IPv4)**. However, due to the growth of the Internet and the depletion of available addresses, a new version of IP (IPv6) using 128 bits for the address is developed. IP addresses are usually written and displayed in human-readable notations, such as 172.16.254.1 (IPv4). Two versions of the Internet Protocol (IP) are in use: IP Version 4 and IP Version 6. Every version defines an IP address differently. Because of its preciseness, the term IP address typically still refers to the addresses defined by IPv4.

IPv4 Address

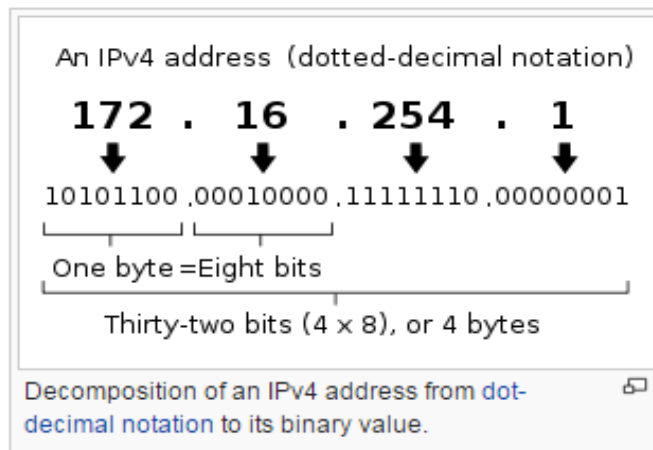


Figure 2: An IPV4 Address Dotted Decimal Notation

In IPv4 an address contains of 32 bits which limits the address space to (2³²) possible unique addresses. IPv4 has reserved some addresses for special purposes such as private networks or multicast address. IPv4 addresses are usually represented in dot-decimal notation, which contains of four decimal numbers, each ranging from 0 to 255, separated by dots, e.g., 172.16.254.1. Each part represents a group of 8 bits (octet) of the address. In case of technical writing, IPv4 addresses may be presented in hexadecimal, octal, or binary representations.

IP Webcam Application

IP webcam is a mobile application which is used in the project. IP webcam works for the audio and video transmission through the IP address. It takes the IP address of the provided network into the vicinity and that IP address is edited into the code of the project for audio video transmission respectively. It has different IP addresses for different provided networks. We use this application because of the preciseness of camera we can use other cameras too but it leads to limitations in the results.

C. RESULTS

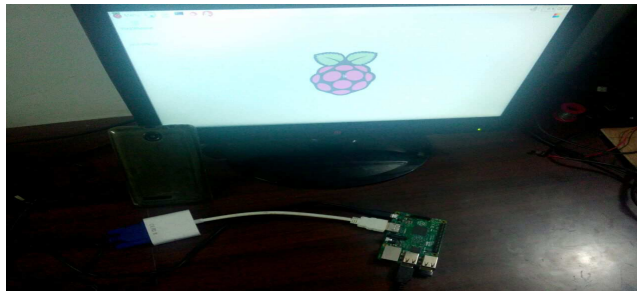


Figure 3

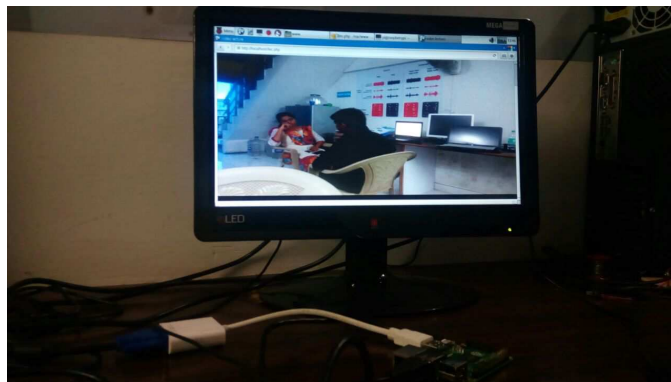


Figure 4

D. CONCLUSIONS

Raspberry pi is useful for small application development because it can be used to integrate with many components such as speakers cameras wireless communication units to develop smart applications. In this project wi-fi module is used to provide a internet connection to create a network on which all the components i.e. raspberry pi computer and mobile application IP webcam works. Raspberry pi acts as a server by using its operating system Raspbian. This O.S. creates a unique Linux like system which totally works to give the desired work which is secure also because it is very important to protect the file for data consistency and accuracy. In this project a video lecture is delivered at different places at the same moment of time as well as recording of the video lecture is done simultaneously so it can be accessed anytime whenever the user is in need. This whole process is done using internet protocols (IPV4).

REFERENCES

1. J. S. Lee, Y. W. Su, and C.C. Shen, "A comparative study of wireless protocols: Bluetooth, UWB, Zigbee and wifi", proceedings of the 33rd annual conference of the IEEE industrial electronics society (IECON), pp. 46-51, November 2007.
2. 2007.
3. E. Ferro and F. Potorti, "Bluetooth and WiFi wireless protocols: a survey and a comparison", wireless communications, IEEE, vol. 12, no. 1, pp. 12-26, February 2005.
4. J. S. Lee, "performance evaluation of IEEE 802.15.4 for low rate wireless area networks", IEEE Transactions on consumer electronics, vol. 52, no. 3, pp. 742-749, August 2006.

5. Xbee series 2 OEM RF Modules product manual”, Digit international, Inc., June 2007.
6. Jeff Brown, Bill Shipman and Ron Vetter, “SMS: The short message service”, IEEE computer society, pp. 106-111, December 2007.
7. Darshankumar C. Dalwadi, Ninad Trivedi, Amit kasundra, “wireless notice board our real time solution” National Conference on recent trends in engineering and technology, May 13-14 (2011).
8. Swiatkowski, M.; Wozniak, K.; Olczyk, L., “Student notice board based on LED matrix system controlled over TCP/IP protocol”, Photonics and Microsystems, 2006 International students and young scientists workshop, vol., no., pp. 59, 60, June 30 2006- July 2 2006.
9. Rohan Mishra, Sambit Kumar Das, “GSM based display LCD toolkit” Department of electronics and communication engineering national institute of technology Rourkela 2007.
10. J. S. Lee, Y. W. Su, and C. C. Shen, proposed a ”A Comparative Study of Wireless Protocols: Bluetooth, UWB, Zigbee, and Wi-Fi”, Proceedings of the 33rd Annual Conference of the IEEE Industrial Electronics Society (IECON), pp. 46-51, November 2007
11. “Zig-Bee Series 2 OEM RF Modules Product Manual”, Digi International, Inc., June 2007
12. Agamanolis. S, “Digital displays for human connect endless”. In public and situated display Social and international aspects of shared display technology. K. Elissa, “Title of paper if known,” unpublished.
13. Badri, M.A.; Halim, A.K., "Design of moving message LCD display system (MMDS) via Short Message Service (SMS) entry using Rabbit 2000 microcontroller," *RF and Microwave Conference, 2008. RFM 2008. IEEE International*, vol., no., pp.81, 85, 2-4 Dec. 2008
14. RPi Projects developed under the reference of <http://elinux.org>.
15. Swiatkowski, M.; Wozniak, K.; Olczyk, L., “ Student Notice Board Based on LED Matrix System Controlled Over transmission control protocol/internet protocol”, Photonics And Microsystems, 2006 International students and young scients workshop, vol., no., pp.59,60,june302006- july22006
16. Rohan mishra, sumit kumar das, GSM Based Display Toolkit” dept of electronics and communication engineering national institute of technology Rourkela200

