Cost Effective Android Based Wireless Notice Board

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Abstract – In the day to day life, smartphone is gaining a wide range of importance in its usage and is portable. Thus an android smartphone can be for the purpose. An android application is installed in the user's smartphone which permits the transmission. The project is based on the development of simple and low cost Android based wireless notice board which is easy to use. Instead of manually changing the notices through paper, this system proposes a approach of displaying the notices by accepting the input commands from the user and displays it wirelessly. At receiver end, a low cost microcontroller board (Arduino Uno) is programmed to receive and display messages in any of the above communication mode. Using the developed system, two different applications for displaying messages on a remote digital notice board and wireless person calling has been implemented. The developed system will therefore aims in wirelessly sharing the information with intended users and also helps in saving the time and the cost for paper and printing hardware.

Index Terms – Android, Bluetooth, Microcontroller, Wi-Fi, Wireless Notice Board.

1. INTRODUCTION

Mobile Phones and the related technologies are becoming more and more ubiquitous. Various technical arenas in the field of Telecommunication and Embedded Systems have come very near to the common people. The number of people with cell phones is on the rise. A day will come, somewhere in the near future, when a mobile phone is referred to in the same class of Food, clothing and shelter". Improvements in the Networking technologies have fostered growth of very dense networks. Land line telephones have been becoming less and less popular and people now prefer communicating while on the move. A Remote Control is perhaps the most popular gadget today. Right from the intense creativity of remotely controlling laser chip markers to the highly destructive remotely ignitable bombs, from the pins to the planes, remote control is not only occupying a omnipresence state, but is also enhancing its scope and domains. When people have a good connectivity at their disposal, with tremendous power of mobile computing to supplement the same, we can think of connecting their home appliances to a mobile phone wirelessly. With this, people would be able to turn on and off, and to some extent, control the appliances at their home even from a distant place. One of the very basic examples of an utility of this is switching on the air conditioner in the room just some time before reaching home, so that the room is sufficiently cool by then. The usefulness of a long range remote control to home appliances has no limits. A setup facilitating such a thing would be to connect the home appliances to a microcontroller interfaced to a GSM modem that receives the controls from the user, the means of sending signals to the appliances being a mobile phone.

Smart phones are playing vital role in human life. They are easy to use, promising and durable devices that help in performing day to day tasks. Embedded systems using wireless technologies are widely used for communicating with peripheral devices.

In this paper, the development of a simple and low cost wireless Android based notice board is presented. The proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication in displaying messages on a remote digital notice board. Android based Application programs available for Bluetooth and Wi-Fi communication for personal digital assistant (PDA) devices are used for transmitting the alpha-numeric text messages. Using the Bluetooth or Wi-Fi based serial data communication technique, the corresponding transceiver module has been interfaced with microcontroller board at the receiver end. For this purpose, a low cost microcontroller board (Arduino Uno) is programmed to receive alphanumeric text messages in any of the above selected communication modes. The proposed system will help in reducing the human effort, paper, printer ink and cost for manual changing of the notices.

2. RELATED WORK

2.1 Wireless Communication for Android Based Notice Board

From the communication mode selected by the user, Bluetooth or Wi-Fi based wireless communication for Android based notice board is used. The Andriod based software application program for Bluetooth and Wi-Fi communication in the proposed system are explained below.

2.1.1 Bluetooth Terminal

Bluetooth Terminal is an Android application program that enables the Android PDA's to communicate simply with a Bluetooth device via a terminal. Bluetooth Terminal application program therefore enables the Android PDA to transmit (or receive) the messages in either hexadecimal (hex) or string format to (and from) the connected Bluetooth devices. At the receiver end, the HC-05 module is interfaced with microcontroller that is programmed to store the received message and display that to the LCD screen.

2.1.2 Wi-Fi keyboard

Wi-Fi keyboard application program for Android the enables the Android based PDA's to send the string to the Wi-Fi device. At the receiver end of the developed system, the Wi-Fi transceiver module (ESP 8266) communicates with Wi-Fi keyboard application program installed on Android PDA via Wi-Fi network. ESP 8266 module is interfaced with microcontroller that is programmed to store the received message and display that to the LCD screen.
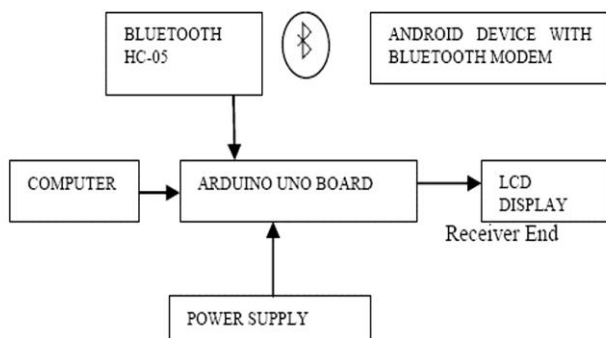
2.2 Hardware Implementation

Fig.1 Bluetooth Communication for Android based Wireless

Notice Board

The microcontroller board (Arduino UNO) is programmed in a manner that on its correct initializing with LCD and transceiver module, welcome message will be displayed on LCD. The user selected communication mode (Bluetooth mode or Wi-Fi mode) is also displayed on the LCD screen as the corresponding transceiver is connected. Every Bluetooth

device has their unique Media Access Control address (MAC) address. MAC address is a unique identifier assigned to network interfaces for communications on the physical network segment. The interfacing of Android based PDA with wireless notice board in Bluetooth communication mode using Bluetooth transceiver HC-05 is shown in Fig.1

Android based wireless notice board interfaced in Wi-Fi communication mode using Wi-Fi transceiver ESP 8266 is shown in Fig. 2.
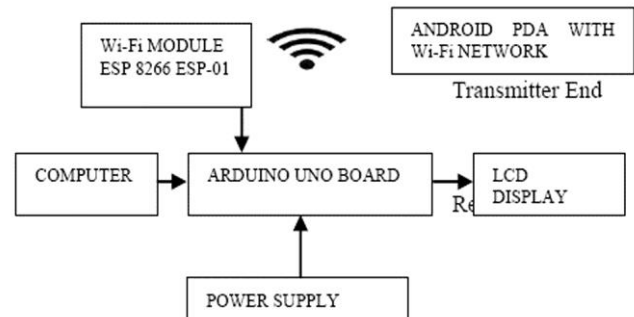

Fig.2 Wi-Fi Communication for Android based Wireless
Notice Board

3. PORPOSED MODELLING

Using the developed system, two different applications of displaying messages on a remote digital notice board and wireless staff/person calling has been implemented and described below.

3.1 Android based Wireless Notice Board using Bluetooth communication

Using the Bluetooth interface a Personal Area Networks (PANs) has been created in the range between 10-15 meters. Bluetooth uses the 2.45 GHz frequency band for connection. A HC-05 Bluetooth module has been interfaced with the microcontroller board (Arduino UNO) using serial communication. The module's Media Access Control address is used by Android application program (Bluetooth Terminal) which allows only this device to communicate with the smartphone for controlling the external devices. The interconnection of Android PDA with the external Bluetooth devices like HC-05 Bluetooth module, using Bluetooth terminal for transmitting or receiving the data in form of hex or string. Using the android based wireless notice board in Bluetooth communication mode the user can send the alphanumeric text message instantly once the connection is established between Android based PDA and Bluetooth device (HC-05). The notice on the LCD display can be changed at any time by resending the new message from PDA using android application program that is Bluetooth technology. The new message will overwrite the previous message making the system very simple and easy to use. The

implementation of Android based wireless notice board using Bluetooth communication is shown in Fig. 3 below.
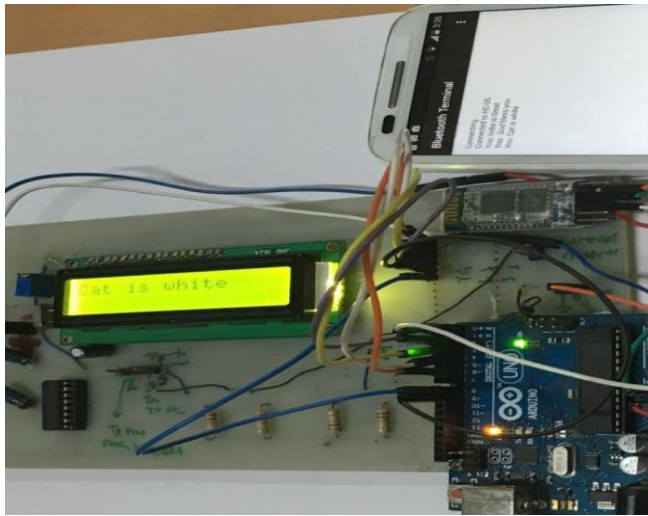

Fig. 3 Android based wireless notice board using Bluetooth Communication

3.2 Android based Person Calling system

Using the developed system, the nurse/office staff or person calling system has also been implemented by programming the microcontroller to get the specified key of the person. In the implementation mode if the received character key from the Android PDA matches with the stored character in the flash memory of microcontroller then the specific person will be called. The microcontroller is programmed to keep on checking the received serial data from Android PDA after every 30 seconds. For not receiving of any specified or stored character key a Known message of "Welcome to Amity" will be displayed. The wireless calling system in idle state is shown in Fig. 4.
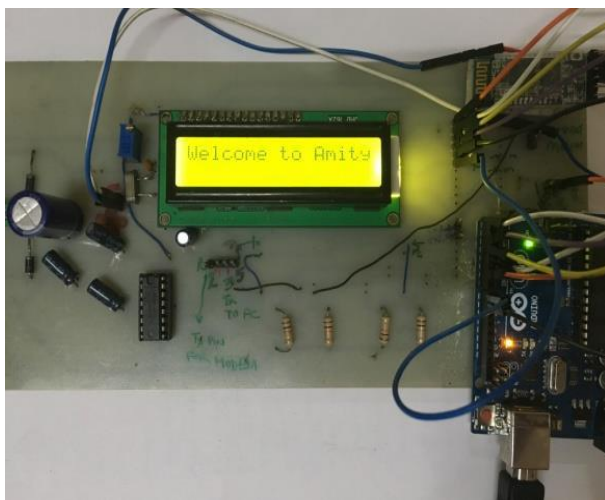

Fig. 4 Wireless Calling System in Idle state

On receiving a specified character key like "1", the microcontroller compares it with the stored key and displays the corresponding message for calling specific person on the LCD.

4.   RESULTS AND DISCUSSIONS

A For communication in WI-Fi mode, ESP 8266 module is interfaced with microcontroller board that is programmed with AT commands to receive the user messages at an enhanced range of 200-250 meters from the Android PDA. By using the Wi-Fi communication technique, although the range of receiving messages on wireless notice board is improved but it adds to the system cost by requiring an additional power supply of 3.3 volts as the power taken by receiving a data packet is much more than the Bluetooth communication, so the system requires a tradeoff between more range and added cost. The complete system assembly for receiving the message from the Wi-Fi Keyboard at the Android based PDA is shown in Fig.5.
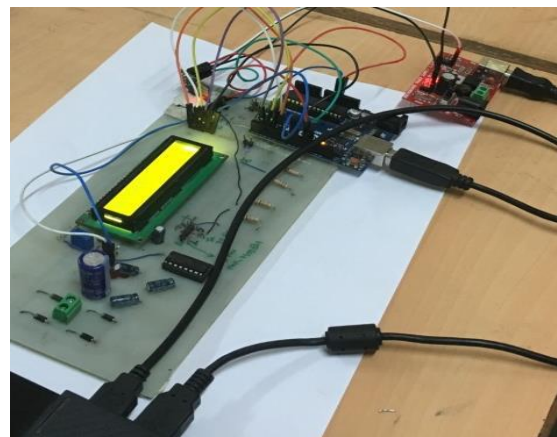

Fig. 5 Android based wireless notice board using Wi-Fi communication
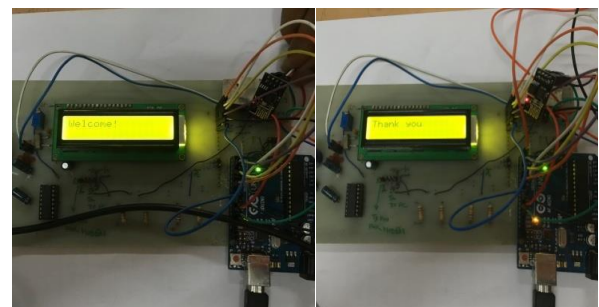

Fig. 6 Implementation of wireless notice board using Wi-Fi communication

The ESP 8266 module communicates with Wi-Fi keyboard application program installed on Android PDA via Wi-Fi network. The implementation of Android based wireless

notice board using Wi-Fi communication for displaying different messages is shown in Fig. 6.

5. CONCLUSION

Here by introducing the concept of wireless technology in the Field of the communication. We can make our communication more efficient and faster, with greater efficiency. We can display the messages and with less errors and maintenance. This system can be used in various applications like banking, schools, restaurants offices, hospitals, score boards for sports etc. The voice calling feature can be added with the proposed system as a further enhancement for using the system in railways, airport or bus stations. Latency involved in using of papers in displaying of notices is avoided and the information can be updated by the authorized persons.

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