Voice Over WiFi Based Smart Wireless Notice Board

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Abstract

The notice boards are being handled manually in many applications. In order to put up notices on the notice board lot of resources such as paper, printer ink are wasted and addition it consumes a lot of time to make notification. In this project we have proposed a system to wirelessly transmit short notices using campus Wi-Fi to reach students quickly in the classrooms. The proposed system is low cost and energy efficient system as employs Raspberry pi controller to receive notices and display on LCD or terminal.

Keywords - *VOIP, wireless smart notice board, WiFi.*

I. INTRODUCTION

This Notice Boards are a part of communication in any institutions or organizations which are used to display any notification that reach quickly to intended persons. In the current scenario the notice boards can be digitally managed due to advanced wireless technology and can be remotely controlled. User has to make voice announcements anywhere in the campus as required or sent messages which is displayed on electronic notice board placed at required location. It means user doesn't have to go near the Electronic notice board to change the message. Wireless communication technique used in this project is Wi-Fi technology. Microcontroller receives these commands and it passes these commands to the display. To ensure secured notices, only authorized people have been given access using a graphical user interface to make announcements.

In literature, electronic Notice board that are suggested works with Bluetooth on short range or WiFi with hotspot. Electronic notice boards using Bluetooth technology have also been implemented but it is compatible only for low bandwidth applications. Bluetooth bandwidth is around 800 Kbps. The average range is around 10-100 meters which is very less compared to the Wi-Fi technology. It operates at frequencies between 2400 and 2483.5 MHz. [1-3]

For message display using the GSM technology, the message received from mobile phone is displayed on LCD. Here the data can be lost in case of power failure. The range is around 880-915 MHz (uplink) and 925-960 MHz (downlink), whereas for wireless networks, it has a better average range of around 2.4 GHz. In GSM the data speed is comparatively lower and more expensive.

WI-Fi provides the widest channel bandwidth and allows large data transfer. The comparison of the above parameters leads us to select Wi-Fi technology for our proposed system. We use Raspberry Pi development board in our project that is easily programmable[4]. The advantage of proposed notice board is that for announcement it employs WiFi network within the campus and announcement can also be made from outside the campus using internet by using efficient protocols such as COAP, WebIOPi framework, packet forwarding mechanism[5-7].

II. PROPOSED SYSTEM

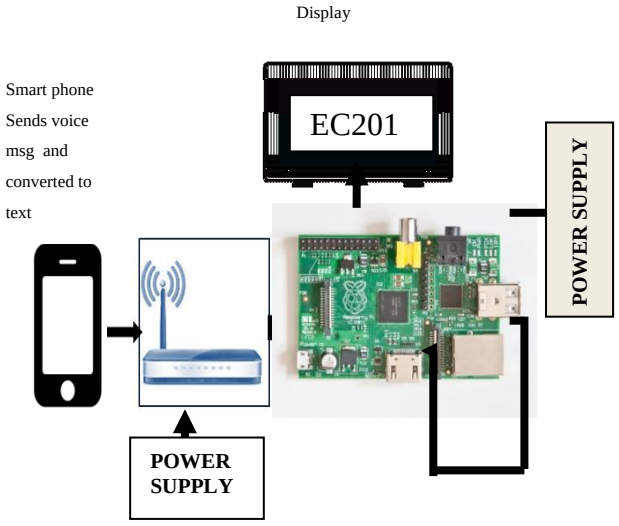

Fig. 1 Block Diagram of VOIP Notification System

Our proposed model consists of two modules i.e. Transmitters and Receivers module. The transmitter module consists of interfacing computer or smart phone and connected with Wi-Fi connectivity. The receiver module placed at the remote end also has Wi-Fi connectivity to micro- controller with display device. Here Raspberry Pi is connected to the Internet with the help of a wireless adapter. Raspbian Jessie is installed and SSH client is used to securely connect to raspberry pi through the available IP address. The converted text message sent from smart phone has to be displayed on display connected ton raspberry pi terminal. Raspberry pi with display will be installed in the class rooms of college campus. A separate navigation website is to be developed for accessing the other webservers present in the Local Area

Network (LAN). This enables the user who has logged in to select a particular region in which the notice has to be displayed. Any authenticated user can log in and make an announcement and select the destination. The notice will be displayed on the terminal. Fig.2 shows the flowchart of communication.

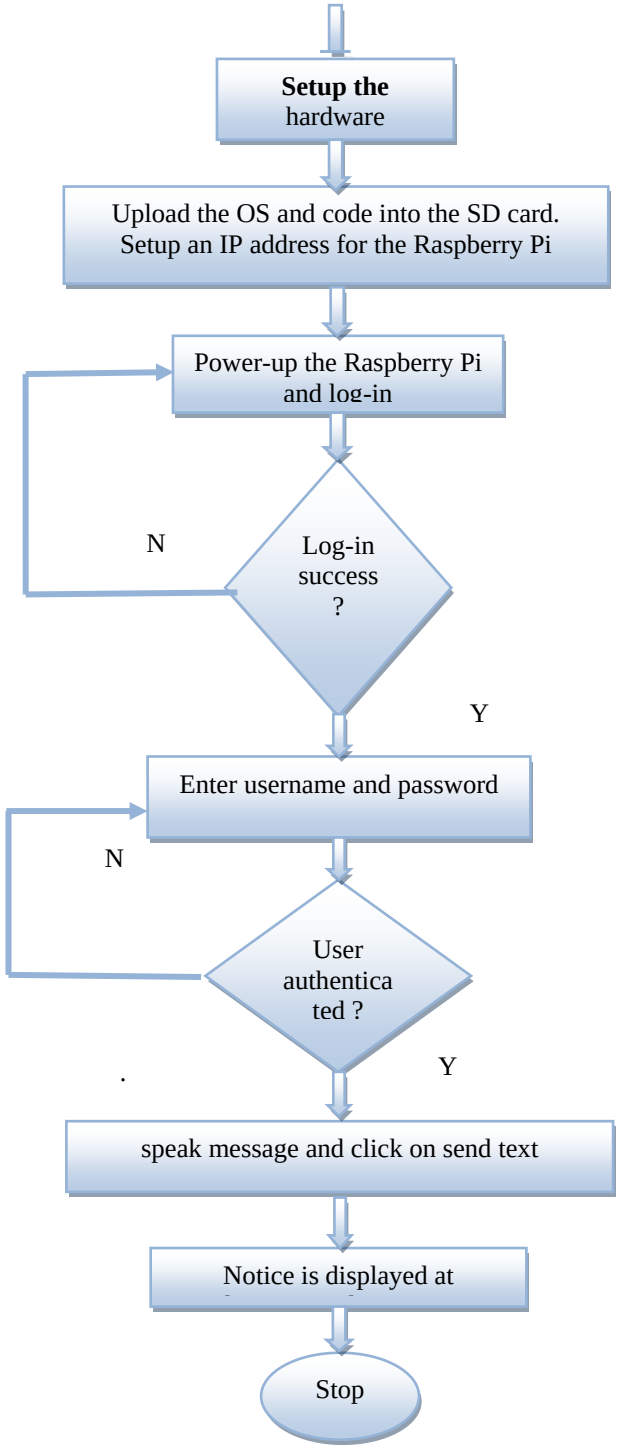

Fig. 2. Flow Chart for Voice Over Wifi Communication

A web server that hosts a webpage for the conversion of speech to text has to be implemented on transmitter. Password based authentication is employed on the transmitter side in order to provide access control to only authorized users. A log-in page is created using HTML and used to provide access to the Notification system if authorized. A user log-in database is created using MySQL. Consequently, when a user enters username and password, the data entered is verified with the data stored in the database. When the information entered in the log-in page matches with the data stored in the database, the user is redirected to another webpage where the user can click on the required class room block button which redirects to record a notice to be sent. The server encrypts output and python code is used to parse the notification from the received output. The extracted message is saved to a text file it is displayed on the LCD display or Raspberry Pi terminal.

WebIOPi is a IOT framework used for creating a web server. A mobile phone with connected Wi-Fi connectivity is used to interact with the user end application. An authentication website is created which allowed only authorized persons to navigate to desired destinations to which the announcement had to be made. The notices could be recorded where speech to text conversion was implemented to convert the voice messages to text messages. The send button initiates a HTTP GET request using Constrained Application Protocol (CoAP). The Constrained Application Protocol (CoAP) is web transfer protocol used with constrained nodes. As in HTTP, CoAP is based on successful REST model where servers make resources available under a URL, and clients access these resources using methods such as GET, PUT, POST, and DELETE.

In order to make HTTP transactions more secure, basic access authentication is a method we have used is to provide a username and password when request is made by user. The server will request the user agent to authenticate itself by sending a request for authentication using “HTTP 401 Not Authorized” code. The user agent uses the authorization header, after which it sends the credentials back to the server and is created in the following way. The login credentials are combined into a string "username: password". The "username: password" string is encoded using the Base64 scheme.

III. RESULTS AND DISCUSSION

The message string is received and parsed on the Raspberry Pi module at the desired location. As seen in the figures 4 below, when the microphone button is clicked and voice notice is spoken, the speech is converted to text and displayed in the textbox. On clicking ‘Send Text’ the message is seen at the Raspberry Pi terminal after parsing. Similar results are demonstrated in Fig.3 where speech message from smart phone is sent through WiFi and displayed at LCD connected to Raspberry Pi board placed at classroom as shown in Fig.4. Similarly Fig.5

and Fig.6 shows notification sent from smart phone getting displayed on LCD in classroom respectively.

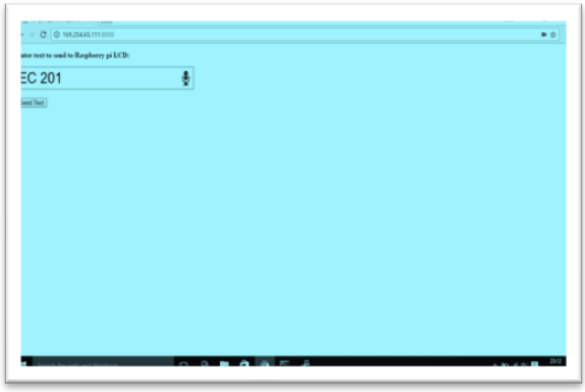

Fig. 3. Speech to Text Conversion on User Terminal

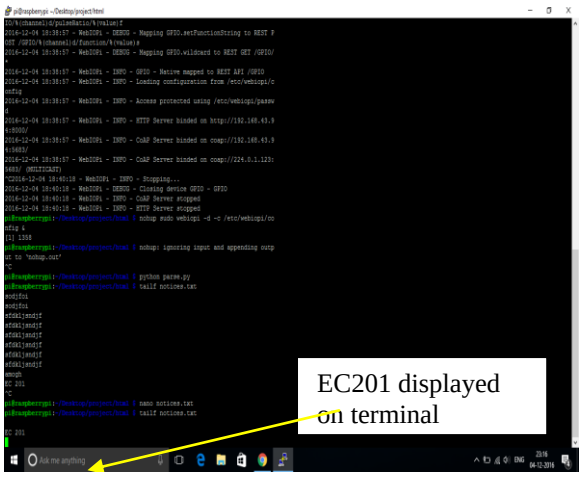

Fig. 4. At Class Room Notification on Raspberry Pi Terminal

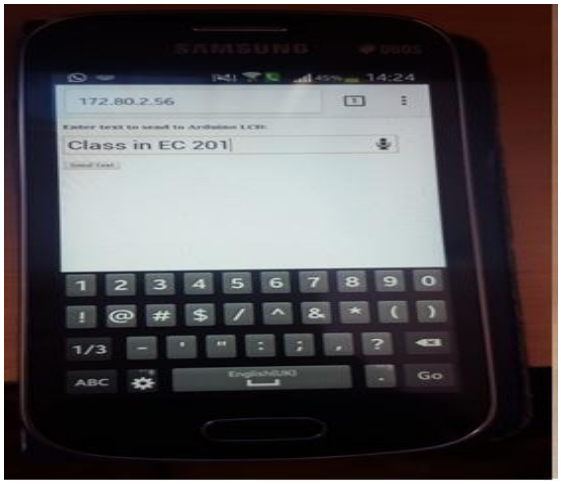

Fig 5. Speech Notification Converted to Text and Sent from Smartphone

Fig. 6. Sent Text Displayed at Class Room on LCD

IV. CONCLUSION

The prototype is very efficient as the components used are very simple and easily available in the market. This can be deployed commercially at places such as colleges, banks, railway station and in industry for flashing notifications. It would be a cost effective solution as in most of the places WiFi and internet is already available. Along with the message notification, date and time of ongoing events can be flashed timely.

REFERENCES

[1] Ajinkya Gaikwad, Tej Kapadia, Manan Lakhani & Deepak Karia, "Wireless Electronic Notice Board".
[2] Prof. V.P.Patil, Onkar Hajare, Shekhar Palkhe, Burhanuddin Rangwala," Wi-Fi Based Notification System"., The International Journal Of Engineering And Science (IJES), ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805,2014
[3] Bhumi Merai , Rohit Jain , Ruby Mishra, "Smart Notice Board", International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 4, April 2015
[4] https://www.raspberrypi.org
[5] http://webiopi.trouch.com/
[6] https://www.debian.org/releases/jessie
[7] https://docs.python.org/2/library/htmlparser.html