ELECTRONIC NOTICEBOARD USING WI-FI

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Abstract—Notice board is a primary thing in any institution or public utility places like railway stations, bus stations, colleges, malls etc. But sticking various notices day to day is a difficult process. A separate person is required to take care of this notices display. This process is about advanced wireless notice board. The project presents an electronic notice board using Wi-Fi. The idea behind this project is to provide its users with a simple, fast and reliable way to put the important notices on monitor. Wireless is a popular technology that allows electronic devices to exchange data wirelessly over a computer network with high-speed wireless connection. The message can be sent through a web page designed in this project, to the Raspberry Pi 3 model B which has ARM version 8 processor in it. The received data on raspberry pi model is stored in the database and displayed it using web page over the monitor. The monitor is interfaced with the raspberry pi using HDMI cable.

Index terms: Web server, Raspberry Pi, Wi-Fi interference.

I. INTRODUCTION

In this world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded Systems are becoming omnipresent in the people. The use of cell phones has rapidly increased over the last decade and a half. Upgradation in networking technologies has encouraged the development and growth of very dense networks.

Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large. A lot of paper is been used and which is later wasted by the organizations. This in turn leads to a lot of deforestation thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environment issues which we are presently concerned about.

The main aim of this project is to design a Wi-Fi driven automatic display Board which can replace the currently used paper based notice board and conventional notice boards.

It is proposed to design to receive message in display toolkit which can be sent from an authorized user using mobile phone. The whole process can be described from the transmitter and receiver section. The Wi-Fi module receives a message from the authorized user and the message is extracted by the Raspberry pi[1] from the Wi-Fi module and is displayed on the noticeboard.[2] This proposed system in this report has many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc. Being user friendly, long range and faster means of conveying information are major bolsters for this application.

The Raspberry Pi receives a message from the authorized mobile phone and the message is displayed on the TV display board.[3] There are basic four devices in this system out of which three devices are powered. This proposed system in this paper has many upcoming applications in educational institutions and organizations, advertisements etc. Being user friendly, long range and faster means of conveying information are major bolsters for this application.

Fig. 1 Block Diagram
II. OVERVIEW OF PROJECT

We have created a web server, which provides a way to send Notice messages to raspberry pi using flask over HTTP protocol. We have created three web pages for sending notices using HTML language.

The first page is the logging page, which is specifically used for authentication of the user. It consists of the username and password which is only known to user. If the user is authenticated, then the action page is served to the user. This page has mainly three options mainly to add a new message or delete a message from the database.

If the user clicks the add new entry button, user is redirect to the message entry page. In this message entry page, user need to submit the details (such as message header, message body, message start time and message stop time) to the server.

Our server Hardware consists of raspberry pi 3. We uses Flask as web server and the Python as the backend scripting language.

The raspberry pi is connected to the display notice board via HDMI cable. The notice will be displayed on the notice board using this wired connection of HDMI cable. In the reception section of the system, we create web page which continuously displays the message header, notice, number of messages in queue and date-time. All the messages occurring in the database is displayed on the digital notice board if they are valid for the current time window.

III. COMPONENT DESCRIPTION

A) Features and description of various hardware and software components

The Raspberry Pi 3 model B is a low power, high performance 64 bit quad core processor ARMv8 clocked at 1.2GHz with 1GB SDRAM. The biggest advantage with the raspberry pi 3 model B is an upgrade to improved connectivity with Bluetooth Low Energy and BCM43143 Wi-Fi on board.

- 1.2GHz Quad-Core ARM Cortex-A53 (64bit)
- IEEE 802.11 b/g/n Wi-Fi protocol
- Boots from Micro SD card, running version of Linux
- Video Output: HDMI

The Raspberry Pi is a powerful minicomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

![Fig. 2 Raspberry Pi](image_url)
Table 1: Different Wireless Technology

<table>
<thead>
<tr>
<th>Specification</th>
<th>Bluetooth</th>
<th>Zigbee</th>
<th>Wi-Fi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Band</td>
<td>2.4GHz</td>
<td>2.4GHz</td>
<td>2.4GHz, 5GHz</td>
</tr>
<tr>
<td>Maximum Signal Rate</td>
<td>1Mbps</td>
<td>250Kbps</td>
<td>54Mbps</td>
</tr>
<tr>
<td>Nominal Range</td>
<td>10m</td>
<td>10-100m</td>
<td>100m</td>
</tr>
<tr>
<td>Channel Bandwidth</td>
<td>1MHz</td>
<td>0.3-0.6MHz</td>
<td>22Mhz</td>
</tr>
</tbody>
</table>

Table 2: Wi-Fi protocols comparison:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>a</th>
<th>b</th>
<th>g</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>20MHz</td>
<td>22MHz</td>
<td>20MHz</td>
<td>20/40MHz</td>
</tr>
<tr>
<td>Maximum data rate</td>
<td>54 Mbps</td>
<td>11 Mbps</td>
<td>54Mbps</td>
<td>1Gbps</td>
</tr>
<tr>
<td>Modulation technique</td>
<td>FHSS OFDM</td>
<td>DSSS OFDM</td>
<td>MIMO-OFDM</td>
<td></td>
</tr>
<tr>
<td>Indoor range</td>
<td>35m</td>
<td>35m</td>
<td>38m</td>
<td>70m</td>
</tr>
<tr>
<td>Outdoor range</td>
<td>120m</td>
<td>140m</td>
<td>140m</td>
<td>250m</td>
</tr>
</tbody>
</table>

Wi-Fi networks are widely used to connect variety of devices between themselves and between the device and internet. All currently available laptops, tablets, mobile phones have this feature. This wireless connection can merge together multiple devices.

Table 2: Wi-Fi protocols comparison:

IV. WORKFLOW OF PROJECT

To send the notice, we make use of web pages. Front-end web development, is the practice of producing HTML, CSS and JavaScript for a website or Web Application so that a user can see and interact with them directly.

The technology and programming what the end user doesn’t see but what makes the site run is called the back-end. Consisting of the server, the database, and the server-side applications. For back-end purpose we make use of python script. For the previous and incoming message storage purpose we require database. Hence we make use of Structural Query Language i.e SQL.

Whenever user logs into the webserver, we serve the index.html web page to the user. The user will substitute its login details into the web page this action is a post action which is performed by the user. It checks the details provided to the web page i.e. the username and the password. If the username and password provided by the user are correct one, then the user is redirected to the action.html page.

When the user is directed to the action.html page, from the action page the user will select the action, whether he wants to add message or delete message. If user wants to add the message, user needs to substitute the message details correctly and submit it. Now the backend code will receive the message details given by user and insert it into the database.

If user selects to display the messages then valid messages from the database will be shown in table format. If user wants to delete the message, user needs to input the token key for the message to be deleted.

For communication purpose both the devices i.e mobile and raspberry pi need to be connected to the same Wi-Fi via IP address. We can run the web application with the command app.run with the required arguments. It defines which user IP address is to be connected to the Raspberry Pi. We also need to specify the port number to run the web server.

For the receiving section, message read function initially cleans the old data by calling a function called data purge. Data purge function will read the messages and their particular time period in the database. After completing the purification process, backend system of server checks if start time is greater than current time and stop time is less than...
current time. If true, then it will take the message from the database and display it using display.html template. Message rotate, continuously rotates the message after a specific amount of time accordingly and displays the messages present in the queue.

**Results:**

The result will be displayed as follows:

![Result On Monitor](image1)

**Fig. 3 Result On Monitor**

**Result Analysis:**

1) **Index Page:**

Index page is basically a login page. It is used for authentication purpose. It basically allows the user to substitute username and password. It checks for the credentials. If these credentials matches with the saved ones, then the user is served with the next page that is action.html page.

![Index Page](image2)

**Fig. 4 Index Page**

2) **Action Page:**

This page has three main function; one is to add new entry to the database, second is delete the message whichever is not required according to the user, third is message entry. Current messages shows the number of messages, actual messages and there token key which is produced by the system. This token key can be further used to delete the messages.
CONCLUSION

As the technology is advancing every day the display board systems are moving from Normal handwriting display to digital display, further to Wireless display units. This project develops a photo typelaboratory model wireless notice board system with Wi-Fi module connected to it, which displays the desired message of the user through a message in crowded places. This proposed system has many applications in educational institutions and organizations, traffic management, railways, advertisements etc. Being user friendly, long range and faster means of conveying information are major boister for this application.

The display boards are one of the major communications medium for mass media. Local language can be added as a variation in this project. This can be achieved by using graphics and other decoding techniques. Also we realize that this project saves time, energy and hence environment. Cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips.

We believe that our project can become commercial and can be used in places such as colleges, banks railway station etc.
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REFERENCE


[2] Prof. V. P. Patil, Onkar Hajare, Shekhar Palkhe, Burhanuddin Rangwala “wi-fi based notification system” 30 May 2014


