

# Web Controlled Notice Board using Raspberry Pi

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**Abstract**-Notice Board is most essential in many places like institutions, railway platforms, hospitals etc. Traditional notice boards take more time to put up notices. It consumes a lot of resources like paper, printer ink and man power. We have proposed a system which enabled people to transmit notices on a notice board using wireless link. In proposed system only authorized person send notices on notice board. Transmission of notices from remote places is made possible by using any smart-phone/Tablet, Laptop, Personal Computers etc. the developed system is supported by internet, intranet as well as organizational wireless networks. We have tested a system by using Raspberry pi minicomputer which acts as mediator between transmitter and receiver. It has inbuilt Wi-Fi antenna and ethernet port for internet connection.

**Index Terms:** Raspberry pi3, Wi-Fi, Webpage, authentication, GUI, LCD Display.

## 1. INTRODUCTION

The use of Internet has rapidly increased over the time. In the proposed system authorized user sends messages using ethernet or Wi-Fi on webpage. At receiving end Wi-Fi is connected to raspberry pi. The notices are displayed on screen with the help of VGA connector or HDMI cable .Wi-Fi has support to device drivers of the different operating systems. Now a day's people prefer wireless connection because they can interact with people easily and it require less time. The main objective of this project is to develop a wireless notice board that display message sent from the user and to design a simple, easy to install, user friendly system, which can receive and display notice[1, 2, 3].

## 2. WEB CONTROLLED NOTICE BOARD USING RASPBERRY PI

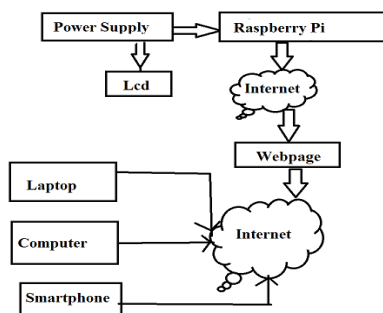


Fig.1. Web controlled notice board

Fig.1. Shows working of proposed system. Raspberry Pi3 has built in Wi-Fi antenna and LAN port through which we can access internet on Raspberry Pi. Procedural steps of system operation are given below.

- Check IP assigned to Raspberry pi of Wi-Fi or Ethernet,
- Add IP in the Programme,
- Open terminal window and give path of Programme on terminal window.
- Go to the Web Browser give IP and port no of Raspberry pi that is 8080. After entering one webpage is opens on which we can type notice.
- Submit Button click on it after submitting the Notice it will be displayed on the LCD screen.

We can connect to the Raspberry pi through android Smart phone, Laptop, personal Computer which are connected to the network.

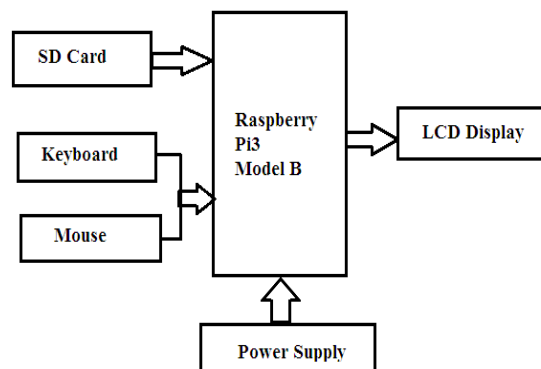


Fig.2. Hardware connection diagram

Fig.2. shows hardware connection diagram of web controlled notice board. Here power supply is given to

raspberry pi through micro USB power port. Raspberry pi has built in wi-fi antenna and Ethernet port to access the internet. SD card is inserted in Raspberry pi and Raspbian operating system is installed on SD card. If we want access Internet browser from raspberry pi then connect keyboard and mouse to Raspberry pi. .

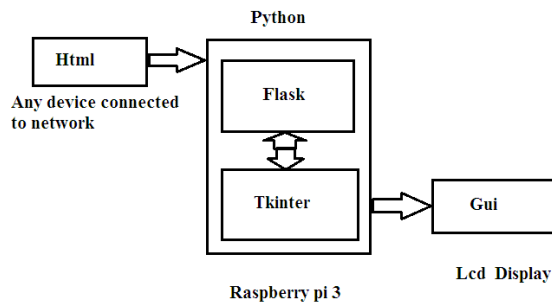


Fig.3. Software architecture of the system

Fig.3. shows software architecture of web control-ed notice board. The Raspberry pi supports flask, python language and Tkinter. It also supports GUI and Html. where flask is a framework used for displaying webpage[4, 5].

### 2.1 Raspbian operating system

Raspberry pi hardware is designed with raspbian free operating system based on debian. Having large no of 35,000 packages and pre-compiled software available for installation on Raspberry Pi. To improve stability and performance, it is still under development.

### 2.2 Python

We have used python for coding raspberry pi. Python is Beginner's Language. It is easy to learn, powerful programming language. It is a widely used general-purpose, high-level machine programming language and python programs are portable, i.e they can be ported to other operating systems like windows, linux etc. It is object oriented and imperative. It has fewer lines of code than would be possible in languages such as C++ or Java. It has feature of dynamic type system and automatic memory management and has a large and comprehensive standard library. Python interpreters are available for installation on many operating systems, allowing python code execution on a wide variety of systems. It is very fast. The source code is compiled into byte code, so that executing the same file will be faster.

### 2.3. Html

At its heart is a simple language made up of elements ,which can be applied to pieces of text to give them different meaning in a document ,structure a document into logical sections and embed content such as text and message into a page. It is language used for web designing. HTML elements are building blocks of HTML pages. HTML describes the structure of a web

page semantically. Browsers do not display the HTML tags, but use them to interpret the content of the page. Following program shows html code for webpage.

Code for html:-

```
<Html>
<Head>
<Title>notice to be displayed</title>
<Meta charset="UTF-8">
<Meta name="viewport" content="width=device-
width, initial-scale=1.0">
<h1>Notice Board</h1>
<div>
<div data-role="content">
<form method="post" action="change">
<label for="slider-1">Notice Message :</label>
<input type="text" name="lcd" id="lcd" />
<br>
<input type="submit",value="submit"/>
</form>
</div>
</html>
```

### 2.4. GUI

GUI is an important part of software application programming in human-computer interaction. We have used tkinter. Tkinter is Python's standard GUI (Graphical User Interface) package. Tkinter is the Python interface to the GUI toolkit shipped with Python. Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object oriented interface to the Tk GUI toolkit. GUI applications can be created using following steps:

- Import the Tkinter package.
- Create the GUI application main window.
- Add one or more of the above-mentioned widgets to the GUI application.
- Enter the main event loop to act against each event triggered by the user.

### 2.5. Flask

Flask is a micro web framework written in Python and based on the Werkzeug toolkit and Jinja2 template engine. The latest stable version of flask is 0.11 as of June 2016. Applications that use the Flask framework include interest, LinkedIn, and the community web page for Flask itself. A vacuum flask, thermos, does not allow heat transfer by any of the three ways that heat can travel. The silver coating on the inner bottle prevents heat transfer by radiation, and the vacuum between its double walls prevents heat moving by convection. Flask is micro framework written in python.

```
@app.route("/")
def index():
    return render_template('web.html')
@app.route("/change", methods=['POST'])
```

```
def change():
if request.method == 'POST':
    # Getting the value from the webpage
    data1 = request.form ['lcd']
if __name__ == "__main__":
app.debug = True
app.run ('192.168.211.169', port=8080, debug=True)
```

### 3. HARDWARE COMPONENTS

Essential components required for assembling this are follows:

- (1) Raspberry pi3 (with in-built Wi-Fi)
- (2) VGA connector/HDMI cable
- (3) Power adaptor
- (4) LCD display

#### 3.1 Raspberry-pi3 model B

The Raspberry Pi is a minicomputer with a 700 MHz CPU and a 250 MHz GPU.

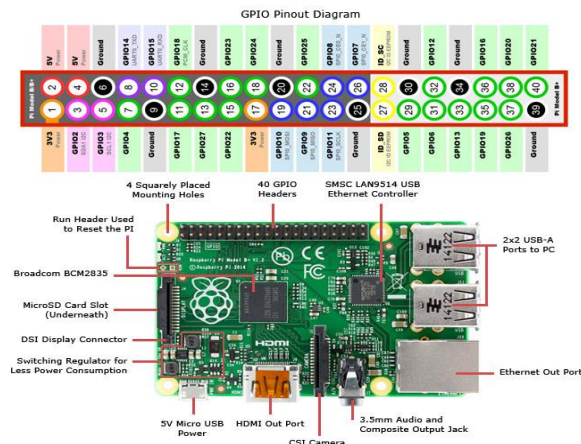


Fig.4. GPIO pins of Raspberry pi

It has inbuilt wi-fi, Ethernet port to access internet. It also has an HDMI port, through which it can be connected to any display device. Also, it has four USB ports. Fig.4. shows GPIO pins of raspberry pi. General Purpose Input/output (GPIO) are a set of generic pins on a Raspberry Pi whose behavior can be controlled as well as programmed through software [8, 9].

Initially it has 26 pins, further 14 pins were added ,so that 40 pin raspberry pi model can be formed.Out of 40 pins, 26 are GPIO pins, 8 are ground, 2 are 5v,2 are 3v & 2pins of IO-SD,IOSC. Any type of display can be used with raspberry pi with the help of VGA cable and GUI.Wi-fi is a high performance, cost effective WLAN USB module which connects the raspberry-pi low cost Computer, to a wi-fi local area network. Wi-fi uses the latest 802.11n wireless technology, and can Support data rates up to 150Mb/s, compared with the older 54 Mb/s 11g products. It also benefits from a higher wireless LAN bandwidth, making data transmission more efficient.

The Raspberry Pi also has an SD card slot, which can act as an internal storage. Raspberry pi is designed to boot from the SD card and can also store an image of

Operating System. It has 1GB RAM. Following steps are used for first time booting:

- Connect the Ethernet cable from the Ethernet connector of the raspberry-pi to router. Internet connection should be working. We need to do this only first time when setup raspberry-pi, so that program can update itself to the latest version. Updates are enabled by default and can be disabled later when we want.
- Connect the HDMI cable from the HDMI port on raspberry-pi to the HDMI port on LCD TV.
- Plug the SD card into slot on the slot on the underside of the raspberry-pi. SD card should have pushed all the way in so that it is making a good contact with the connectors.
- Plug the keyboard & mouse to USB port on raspberry-pi. Finally, insert the micro USB power supply. This will automatically boot the raspberry pi up. It shows raspberry-pi logo after successful installation.

### 4. FLOWCHART

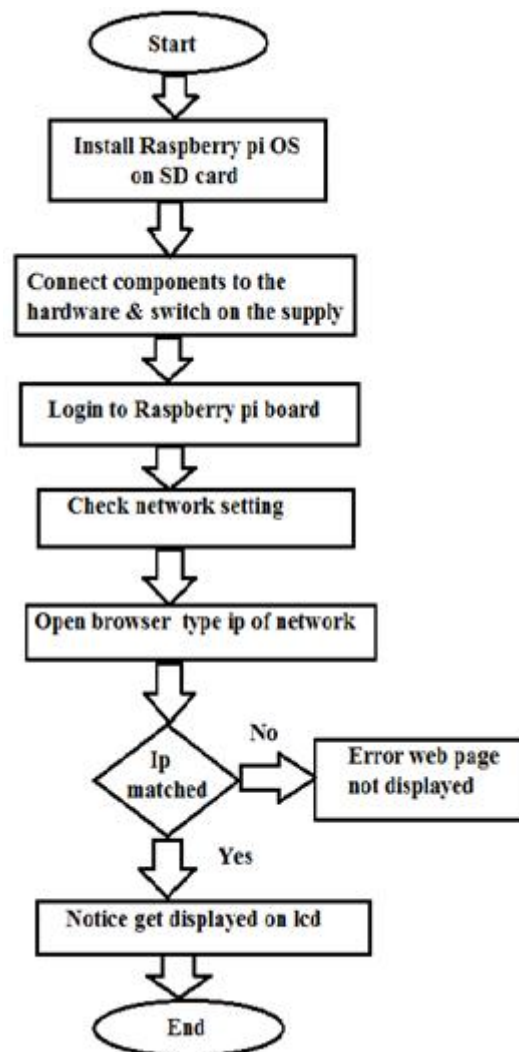


Fig. 5. Flowchart of the system

Fig.5. shows flowchart of web controlled notice board using raspberry pi. It shows various steps to display notices.

## 5. EXPERIMENTAL RESULTS

Steps for displaying notice on notice board:

1. Connect power supply to raspberry pi through micro usb port.
2. Turn on wi-fi of raspberry pi. Whichever n/w you want to connect with raspberry pi connect to it. When connected, find IP address of connected WI-FI n/w with the help of VNC server.
3. Open the actual program and copy same IP address in program.
4. Open the terminal window and write path, where python program is saved. Then press enter. Again, write name of actual program and press enter.
5. Open the browser and type IP address of n/w followed by colon (:) followed by 8080, which is default port of raspberry pi. Then web page is opened as shown below.

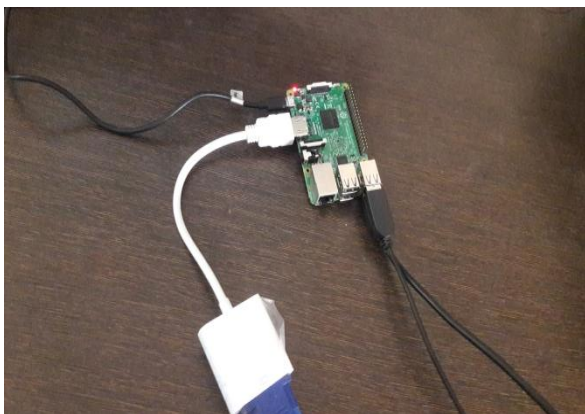


Fig.6. Hardware connection of Raspberry Pi

Fig.6. shows actual hardware connection of the raspberry pi in which we have connected VGA cable to HDMI port. Power cable is connected to micro USB power port. At USB port we have given connection of mouse and keyboard.

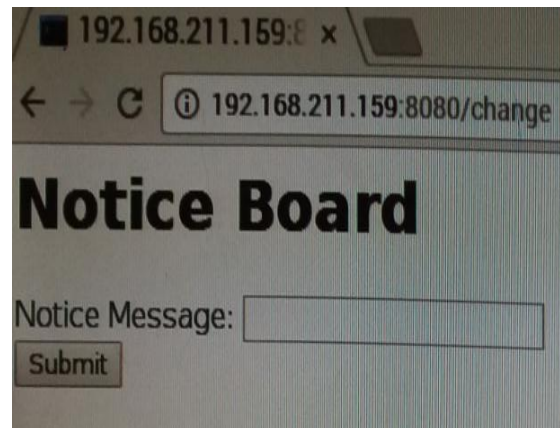


Fig. 7. Empty webpage

Fig. 6.2 shows empty webpage. It has IP address 192.168.211.159 followed by 8080.8080 denotes default port of raspberry pi. 192.168.211.159 denotes connected wi-fi n/w to raspberry pi. It contains title "Notice Board", one label "Notice Message" and one "submit" button. Write notice in slider and then click submit so that it displays as shown below.

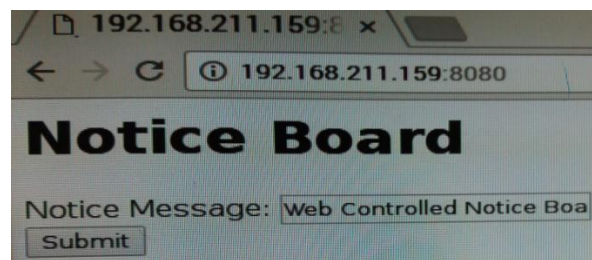


Fig.6.3. Webpage with notice

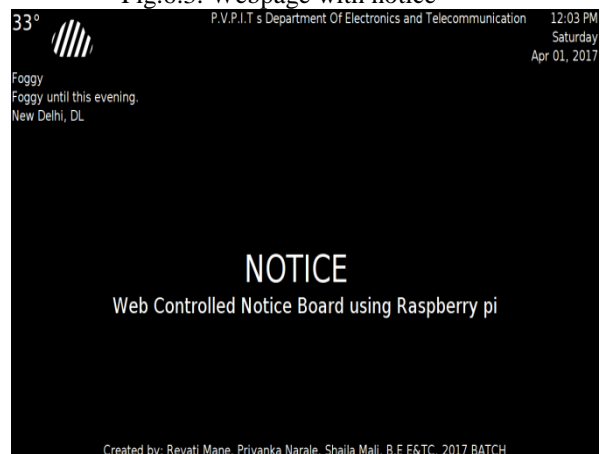


Fig.8. Notice displayed on LCD display

When we enter notice in slider and submit button is clicked, then html communicates with raspberry pi with the help of flask, a web framework. The message displays on LCD display as shown Fig.8.

## 6. CONCLUSION

This paper aims a web controlled notice board using Raspberry Pi which can be used efficiently. Notice boards are enhancing with technology from handwritten to digital. Further to Wireless display units. This paper develops notice board with WI-FI connected to it, which displays the desired message of the user through webpage in a most populated or crowded places. This proposed system has many upcoming applications in public places. It is user friendly and faster means of conveying information are major areas for this application.

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