March - April 2020
ISSN: 0193-4120 Page No. 2109 - 2113

Smart Signage Digital Display

Dr M L Ravi Chandra*,
SRIT,Anantapur, India.
mlravigates@gmail.com

Mandli Rami Reddy
SRIT,Anantapur,India
mandliramireddy@gmail.com

Dr Alam Siva sankar
SRIT,Anantapur,India
alamsivasankar1971@gmail.com

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Abstract
Notice Board is primary thing in any institution or public utility places like bus stations,railwaystations,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 project is about advanced wireless notice board. The project is built around raspberry-pi. Display is obtained on tv. A Wi-Fi is using for Data transmission. At any time, we can add or remove or alter the text according to our requirement. At transmitter authorized PC is used for sending notices. At receiving end Wi-Fi is connected toraspberrypi. When an authorized user sends a notice from his system, itisreceived byreceiver. Wireless is a popular technology that allows an electronic device to exchange data wirelessly over a computer network, including high speed wireless connections. The data is received from authenticateduser.

Keywords: *Wi-Fi, Authentication, Raspberry Pi, HDMI Interface, Web Server.*

1. INTRODUCTION

Nowaday'sindividualslikewirelessconnectionbecausetheycaninteractwithpeopleeasilyand itrequirelesstime. The mainobjectiveofthisprojectistodevelopawirelessdigitaldisplayboard thatdisplaymessagesentfromtheuserandtodesignasimple,easytoinstall,userfriendlysystem, whichmayreceiveanddisplaynoticeinaveryspecific mannerwithrelevancedateandtimewhich willhelptheusertosimplykeepthetrackofdisplayeachdayandeverytimeheusesthe system. A local web server is created, this can be a global server over internet. Display connected to Raspberry Pi is used to display message. When Raspberry Pi receives any wireless message from browser it displays on theTV.The main objective is to design an automatic, self-enabled highly reliable smart digital display. A display connected to a server system should continuously listen for the incoming messages from user, process it and display it on screen. Message displayed should be updated every time the user sends new information. Only authenticated people should update the data to be displayed on the monitor.

2. LITERATURE SURVEY

Dharmendra Kumar Sharma and Vineet Tiwari, **IEEE 2015[1]** introduces a low cost, handheld, wireless electronic notice board by using Atmel's ATmega32 microcontroller and different wireless technologies (Bluetooth and ZigBee) and their performance analysis based on the parameter such as range, BER (bit error rate), RSSI (Received signal strength indicator), signal attenuation and power consumption. The board receives serial information from wireless module receiver and shows it on the graphical liquid display. We have realized a common

communication receiver hardware for notice board having compatibility with both wireless modules i.e. Bluetooth and ZigBee. We used KS0108 based 128×64 graphical LCD as display element.

Neeraj Khera and Divya Shukla, IEEE 2016[2] has developed a simple and low cost Android basedwirelessnoticeboard.Theyproposedsystemuseseither BluetoothorWi-Fibasedwireless serial data communication. For this purpose Android based application programs for Bluetooth and Wi-Fi

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March - April 2020
ISSN: 0193-4120 Page No. 2109 - 2113

communication between Android based personal digital assistant devices and remote wirelessdisplayboardareused.Atreceiverend,alowc ostmicrocontrollerboard(ArduinoUno) is programmed to receive and display messages inanyof the above communication mode. Using the developed system, two different applications for displaying message sona 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 printinghardware.

AniketPramanik,RishikeshandVikashNagar,IEEE2016[3]Duringthisproject,ahardware capable of controlling home appliances and displaying notices electronically using an android applicationhasbeenbuilt.So,thehardwarecanperfor mbroadlytwofunctions.Inordertodisplay notices, a user can use the same application to type a notice and click on the send button to get it displayed. Both the functionality can be used only if sufficientbalanceamount is left in the user's SIM card since each access transactsafixed amount for SMS. The hardware consists of an ARM based microcontroller LPC2148 that communicates to the application through a GSM mobile communication network module which uses a SIM card to receive messages. LPC2148 itself retrieves message and sends signal to switch on/off a device or show anotice.

Kruthika Simha, Shreya and Chethan Kumar, IEEE 2017[4] developed a wirelesselectronic board, that offers the flexibleness to manage data display within a given range on multiple displays. The notice board can show data being transmitted to that from a central dominant unit, employing a serial communication protocol. As technology improves, efficient, financially affordable and extremely productive output becomes an absolute necessity, and this leads us to be more inclined towards using automated control systems. Human intervention, though itoffers selection, ability and interactivity, could lead on to errors, as it is a natural and inevitable results of this variability. Hence, automation of a system is an accepted means that to attenuate human error and its impact.

S.RubinBoseandJ.JasperPremIJRIER2017[5]I nGSMbasedLEDscrollingdisplayboard, GSM modem communicates with the microcontroller through asynchronous serial communication. The microcontroller transmits a set of AT commands to read the message sent bytheuser.Thequickdisplayofmessageusingwireles sdatatransferinsmartnoticeboard.The GSMbasedsystemoffersflexibilitytodisplayfasterth antheprogrammablesystem.Thissystem iseasy,robust,touseinnormallifebyanyoneatanyplac ewithlesserrorsandmaintenance.The paper titled as design and implementation of multiple LED notice boards by using ZIGBEE Technology states that the proposed system is handled by numerous transmissions and themessagefeedsononlyonereceiver.Microcontroll ercontrolsmultipleLED'stoenhancethe message pattern. Here the distanceofwireless communication is limited and this method is not suitable for long distance communication.

M. Arun, P. Monika and G. Lavanya IJCAT 2017[6] The Raspberry Pi2 system acts as the central server of the proposed system and also the Notice boards are accessible only by logging in with the proper credentials within the raspberry pi server. Raspberry Pi2 acts as the server for this e-Notice board system. It's connected to internet employing a correct IP Address, so a certified user of this system can login from anyplace. Raspberry Pi is connected to the intranet network additionally. The display system in school area one will be having an Arduino board withanEthernetShieldandaLCDDisplayhookedup withit.WiththehelpoftheEthernetshield the display node is connected to the computer network. In school area two, the Arduino is connected with a Wi-Fi shield and a LCD Display and this node is also connected to the intranet through Wi-Fi. These devices will also have a valid IP address assigned towardsthem.

Published by: The Mattingley Publishing Co., Inc.

March - April 2020
ISSN: 0193-4120 Page No. 2109 - 2113

3. PROPOSED SYSTEM

Themainfunctionoftheproposedsystemistodevelop aDigitalnoticeboardthatdisplaymessage sentfromtheuserthroughinternetandtodesignasimpl e,userfriendlysystem,whichcanreceive and display notice in a particular manner with respect to date and time which will help the userto easily keep the track of notice board every day and each time he uses the system. The sender is responsible for sending valuable information through the wireless network. For preventing unauthorized access, we provide security authentications like username and password. If the username and password entered are invalid then the user can't access the digital notice board. When the user enters the correct user name and password will be opened and get space for the information transmission. The user can access this web address either using a personal computer or mobile phone. To make the proposed system more user friendly we make an android application. By using this application sender can directly enter into the web address. These messages including text file, image file and the pdf file will send to the cloud. In the simplest terms, cloud means storing and accessing data and programs over the Internet instead of our computer's hard drive.

In the receiver section, Raspberry Pi is connected on Wi-Fi for accessing the internet. The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, andusesastandardkeyboardandmouse.Itisacapablel ittledevicethatenablespeopleofallages to explore computing and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing. Raspberry Pi is activated by supply power around 5v. After switching on Raspberry Pi, it will collect data from the cloud. The web address for collecting data from the cloud is already specified through a program written in the processor. Upon receiving messages it will display on the monitor. RaspberryPihasnoVGAport.Soinordertointerfaceth eLCDmonitorwithRaspberryPi,HDMI interface is used. The received text messages are displayed on the screen like a scrolling manner. Similarly received images will display on the screen. After a certain delay, the next pages will be displayed. All these messages are displayed sequentially after a shortdelay.

Inadditiontothis,weprovideDeletingandmodificatio noptionatttheweblink.Ifthesenderwants to delete some image or pdf file, he can simply delete it by clicking the corresponding link in the webpage.Also,wedeleteormodifytextmessageswhe neverwewant.Afterdeletingthemessages from the cloud, it will automatically delete on the display after a short delay. We can change the scrolling text colour, text size, display graphics, delay between the messages by simply made changes on theprogram.

The block diagram of proposed smart digital display is shown below.

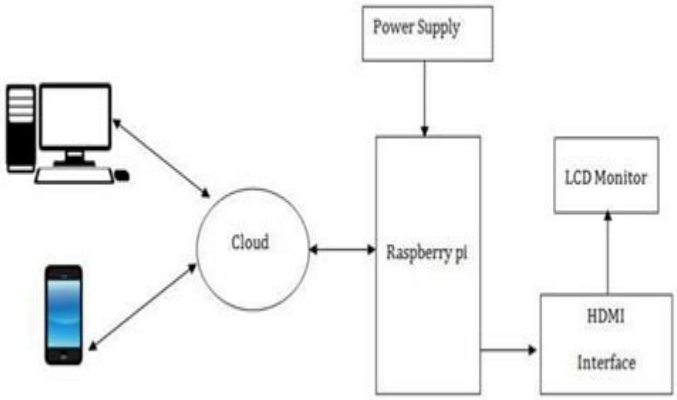

Fig-1 Block Diagram of Smart Digital Display

Proposed method sequence of steps is given below.

Following the step by step procedure will explain the actual working of the system.

1. Start
2. Log in for the access noticeboard.

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March - April 2020
ISSN: 0193-4120 Page No. 2109 - 2113

3. If the user is valid then go to step 4 otherwise go to step2. 4.Select Information in the form of image, pdf and text files 5. Uploadfiles.
6. Store themessage.
7. Set the duration of displayedmessages.
8. The set maximum limit for the size of the image to be displayed. 9.If the received image is less than the limit it will directlydisplay.

Figure 4: upload page

10.Received image and textfiles
11.Display stored messages depending on the schedule,which is to be display. 12.Check for new notice.
13. Repeat the above steps when the power supplymaintained. 14.Stop

4. Results and Discussions

The proposed system was successfully tested to

Figure 5: Displaying pdf files

demonstrate its effectiveness and feasibility. In this paper PC and android application is used as a transmitter and Raspberry is used as areceiver. Senderandreceiverareinterfacedthroughawirelessn etworkDisplayareconnectedatthereceiver side. Raspberry Pi is connected to a Wi-Fi network to access data on the cloud. Afterestablishing connection data stored on the cloud will bedisplayed.

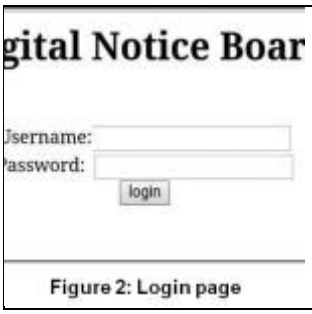

Figure 2: Login page

For sending information sender must enter into the login page. Figure 2 shows the login page of outsmart digital display. Username and Password are predetermined. If we enter the wrong username and password an error will be displayed on the login page, which is shown in figure 3. So, after typing correct username and password in the respective columns, the next page will be displayed in the web server notice.

Password error

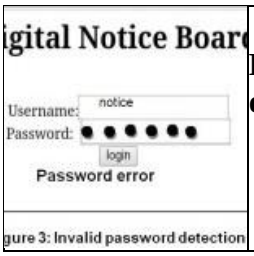

Figure 3: Invalid password detection

Upload page contains icons for sending text messages, pdf files, image files. In addition to this, there is a separate icon for deleting previously send data. Figure 4 shows the uploading page on a web server.

Figure6showstheillustrationofdisplayingnoticeson ourdigitalnoticeboard.Thereceivedimage size does not exceed the predetermined values.Text messages can also be sent from the web application. The messages can be displayed based on the schedule.This process will continue as long as the power supply ismaintained.

Advantages& Applications:

Because of the usage of internet for the transmission of messages have a lot of advantages.

1. It includes high data transmission rate,

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March - April 2020
ISSN: 0193-4120 Page No. 2109 - 2113

better message quality, less waiting timeetc.

2. Username and password authentication system make the system moresecure.

3. Here raspberry pi can act as a central processing unit. So we can send not only texted messages but also can send image files in the form of Jpg, jpeg, png and pdf files with betterquality.

4. Thissystemprovidesthefirststeptoachievingapaperlesscommunity.Duetothereduced usage of paper in a community which make the community environmentallyfriendly.

5. Any failure in the power supply does not effect on the storeddata.

Due to these advantages, the proposed system can be extended to live telecasting of information around the world.

Applications

1. Display Boards on PublicPlaces.
2. SmartCities.
3. SmartColleges
4. RailwayStation

5. CONCLUSION

Theproposedsystemacceptsthemessage,storesit,validatesanddisplaysitontheLCDdisplay. LCD displays are used to display messages in Railway stations, shopping malls for displaying advertisement, Educational institution and organizations, managing traffic in smart cities and other public utility places. Cost of printing and photocopying is also reduced because the information can be delivered to a large number of people in a very short time. It provides faster transfer of information and are easy to install and maintain. It provides an efficient way of displaying messages on Notice Board. It also provides user to easily receive the important information ormessage.

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