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Android Controlled Smart Notice Board Using IoT

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Abstract: ***Notice boards are playing very important role in our day to day life. By replacing conventional analog type notice board with digital notice board we can make information dissemination much easier in a paperless community. Here the authorized user can control notice board through internet. So information can be sent anywhere in the world and can be displayed within seconds. Information may be in the form of Text, Image, PDF, video etc. Android application is used for sending information and Raspberry Pi is connected to the internet at the receiving side. In addition to this a voice recognition system is installed to access the information over voice. The smart notice board also sends the information to the provided Gmail. A URL provided for the smart notice board that will be accessible through any browser and displayed content can be downloaded.***

Keywords: ***Internet of Things, Android application, Raspberry Pi, Smart notice board.***

I. INTRODUCTION

In earlier days people used paper as the medium to convey any messages, the paper as the medium to convey any messages, the paper material which is made up of pulp of the tree, will scarce after few years. It is crucial to save the trees by adopting digital technology rather the conventional methods which are very costly. An alternative to this is the usage of digital technology in daily lives. Notice boards are used in Institutions, Organizations, Hospitals, Railway stations, Shopping mall and many other public places. The conventional notice boards are not so convenient for the modifications to be done messages to be conveyed, also requires ready resources and manpower. Due to the popularity of internet, we choose internet as a medium for transferring information. The internet of Things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics. Software which enables these objects to connect and exchange data. To provide security, we add username and password type authentication system. So only respective authority can send information. Raspberry Pi is the heart of our system. A monitor is interfaced with it, so information in the form of text, image and PDF can display on the large screen.

II. LITERATURE SURVEY

1) Published by International Conference on Recent Trends in Computing (ICRTCE-2021) ,IoT based wireless notice board using Raspberry Pi. Organized by The Electrochemical Society, Vancover-BC-Canada. In this paper the connection between client and server is implemented with IoT using Raspberry Pi.

2) International conference paper published by IEEE ICSCAN 2020, Smart Info-Board System Based on Voice Recognition, Organized by IFET College of Engineering, Villupuram, India. In this paper voice recognition is detailed and implemented.

3) E. N. Ganesh, Implementation of Digital Notice Board using Raspberry Pi and IOT, Oriental Journal of Computer Science and Technology, ISSN: 0974-6471, Vol. 12, No. 1, 2019.

4) International Research Journal of Engineering and Technology (IRJET) 2018, IoT based web controlled notice board, Organized by MVJCE, Bangalore, Karnataka, India.

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III. OBJECTIVES

This smart notice board acts as a stage for the display of multi-type information. The user easily sends the message or information for displaying, from remote areas through web/android application. Every time any notice/information is being displayed, parallelly the notice is sent to the respective mail-id of the intended user. Here in the smart notice board which plays both the audio, video files and they can be downloaded. The smart notice board can be accessed by everyone through URL within Wi-Fi range.

1) The main objective of the system is to develop a wireless notice board that displays notices in the form of image, text, pdf etc., and it’s interfaced with user mobile phones for displaying the information.

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2) A microphone will be placed in the smart notice board to access the voice. Just by querying the file name through the mic, the file will be displayed.
3) As general application, in an educational institution the user data is collected and it's fed to the memory of the system, every time any notice/information is being displayed, parallelly the notice is sent to the user application. The notice sent to the application here is the Gmail.
4) In addition to that a speaker installed, using this system a blind person can get to know about the notice/information.

IV. HARDWARE DISCRIPTION

1) *Raspberry Pi 3 Model B+:* The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64-bit quad core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate PoE HAT The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market.
2) *LCD display:* The LCD screen displays the text, image, pdf as for basic smart notice board. Along with that the audios and videos can be played.
3) *HDMI cable:*The compact-made portable HDMI to VGA adapter connects a computer, desktop, laptop, or other devices with HDMI port to a monitor, projector, HDTV, or other devices with VGA port. Built-in advanced certified ag6200 ic chip converts HDMI digital signal to VGA analog signal it is not a bi-directional converter and cannot transmit signals from VGA to HDMI.
4) *Speaker:* The message is displayed on the LCD screen and Speaker reads the notice.

V. SOFTWARE DISCRIPTION

1) *Raspberry Pi OS (Raspbian Bullseye):* The latest Raspberry Pi operating system based upon the new 'bullseye' version of Debian linux. Recently Bullseye has introduced a new window manager, Mutter, which only works for models of Raspberry Pi with 2GB or more RAM, namely the Raspberry Pi 4, Pi 400 and Compute Module 4. Other Pis will use Bullseye with the old window manager, Openbox.
2) *Python and other programming language:* The code on which the system operates is mainly Python. The other programming languages used in this proposed system are HTML, CSS JavaScript and MySQL. Here the MySQL is used for the storage of data in the system.
3) *VNC viewer:* VNC stands for Virtual Network Computing. VNC Viewer gathers your input (mouse, keyboard, or touch) and sends it for VNC Server to inject and actually achieve remote control. You need a VNC Server for the remote computer you want to control, and a VNC Viewer for the computer or mobile device you want to control from.
4) *Advanced IP scanner:* Advanced IP Scanner is a free network scanner that can locate and analyze all computers available on your wireless or wired local network. With its help, you can get remote access to all PCs, such that you can copy and share files present on the shared folders and turn off systems remotely. The application is portable and can be used by network admins anytime, anywhere.

VI. METHODOLOGY

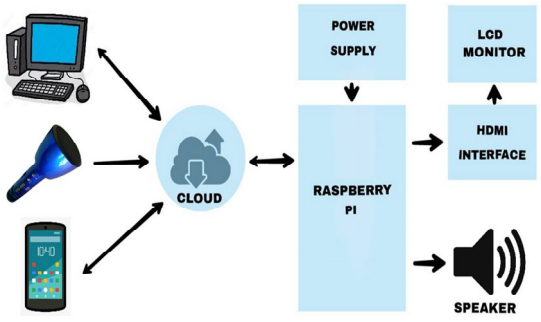


Fig. 1: Block diagram of proposed system

The above figure shows the block diagram of the system. The main objective pf the system is to develop a wireless notice board that displays notices in the form of image, text, PDF. It uses a Raspberry Pi as the processor. Raspberry Pi is equipped with a portable projector/LCD display. We can display messages and can be easily set or changed from anywhere in the world. In addition to mobile application is used to send the information. Here the voice is pass through voice recognition system and display the information. The system will send this message to cloud. Then it passes to the notice board which is connected to internet by Wi-Fi. The processor, processes it and displayed on the screen. The display can also access by the URL provided by typing the URL in any browser we can access the notice board. We can send the message to all screens or desired screen.

VII. ALGORITHM

The client here is the authorized user, and the server is Raspberry Pi. The Raspberry Pi interfaced with router using a Wi-Fi adapter. The user enters router name and password of router, router allots IP address to Raspberry Pi. The TCP server is made on Raspberry Pi which listens for the incoming messages. A TCP client is made on PC which interfaces with TCP server. When a connection is established the client sends message to server. The message sent to the client is stored in a text file on Raspberry Pi and hard disk. The message is displayed on the LCD screen and speaker reads the notice. At the same time the information is also sent to the provided Email. The proposed system also implemented with a web application and voice recognition.

VIII. EXPERIMENTAL RESULTS

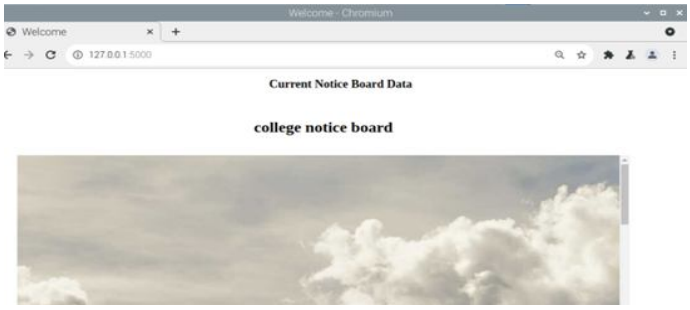


Fig.2: The displayed image

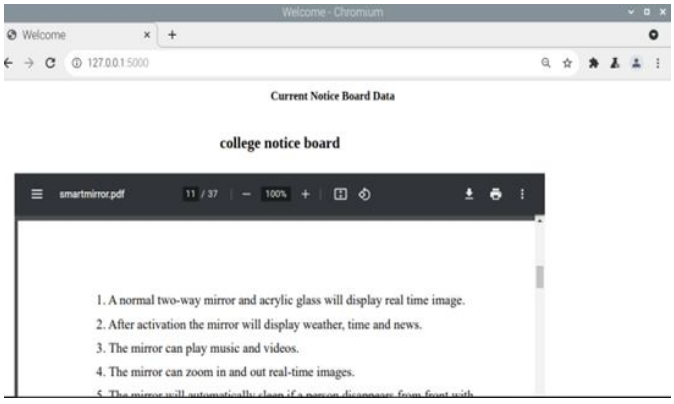


Fig. 3: The displayed PDF

The proposed system was successfully tested to demonstrate it's effectiveness and feasibility. In this paper PC and android application is used as a transmitter and Raspberry is used as a receiver. Sender and receiver is interfaced through a wireless network display is connected to the receiver side. Raspberry Pi is connected to Wi-Fi network to access data on the cloud. After establishing connection data stored on the cloud will be displayed. For sending information sender must log into the system with the registered Email and password. If user enters wrong Email and password an error will be displayed on the login page. SO after entering needed credentials in the respective columns, next page will be displayed on the web server. Later select and upload the notice to be displayed. Intended content be displayed on the LCD monitor as shown in Fig 2. The below figures displaying the PDF and image. Along with images, PDF, texts, audios and videos can also be played. This makes the system an efficient way for knowing any notice/information.

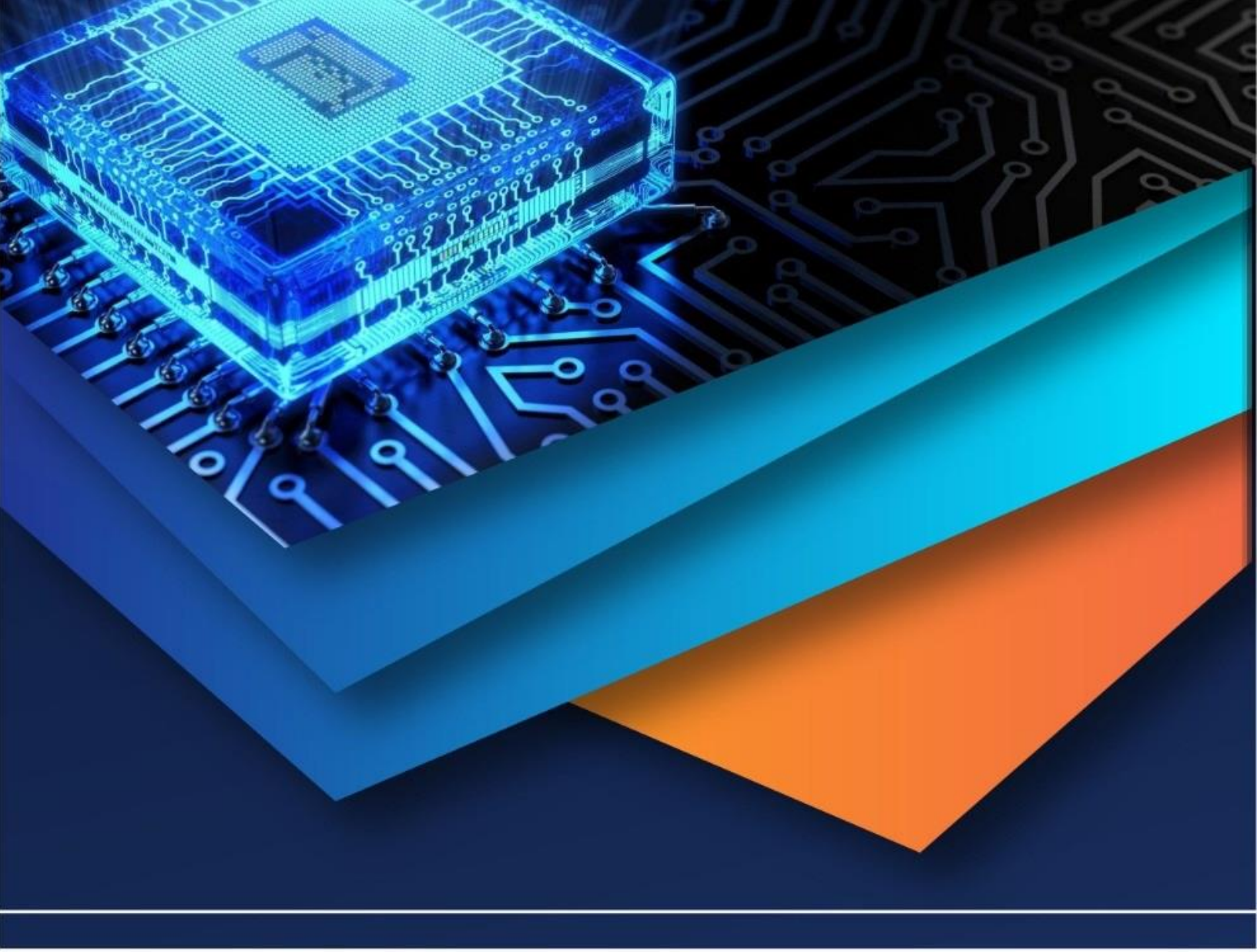
IX. CONCLUSION

Now the world is moving towards digitalization, so to make changes the previous techniques should be upgraded from time to time. Wireless technology provides fast transmission over long range data transmission. It saves time, cost of cables and size of the system. Data can be sent from anywhere in the world. Email and password type authentication system is provided for adding securities. Previously the notice board using Wi-Fi was used. In that there was the limit of coverage area, but in our system the internet is used as communication medium, So there is no problem with coverage area. Multimedia data can be stored on chip or on SD card. Text messages and multimedia data can be seen fast as possible with better quality.

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